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To identify variables accounting for variation in diffusion of cooperative agricultural occupations curriculums, data were collected by interviews with 32 teachers who were participants in one of the agricultural occupations institute workshops conducted at Oklahoma State University during the summers of 1965 or 1966 who were still teaching vocational agriculture in the same school in 1968, and their administrators. Regression analysis was used to compute a simple correlation matrix, partial and multiple correlation coefficients, and a multiple regression equation for use in predicting diffusion of cooperative agricultural occupations curriculums into a vocational agriculture program. Variables related significantly to diffusion were (1) number of teachers in the department, (2) number of students enrolled, (3) teacher innovativeness, and (4) the number of non-farm students enrolled. The multiple regression equation accounted for 70.1 percent of the variance of the predicted criteria. Some recommendations were: (1) Multiple teacher departments are needed for program expansion, (2) More innovative teachers should be used to conduct purposeful changes, and (3) Schools with large enrollments and large non-farm enrollments should be encouraged to add cooperative agricultural programs. An earlier publication concerning this study is available as VT 006 642. (DM)

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September 1968

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U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

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Research Foundation

Stillwater, Oklahoma

September 1968

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U.S. DEPARTMENT OF
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Preface

The dynamic growth of agricultural industry has placed increased emphasis on technical proficiency. Personnel needs are complex requiring sophisticated knowledge of machines and processes. The pressing need in agricultural education is to supplement production agricultural training with experiences which will equip young people for non-professional, skilled, employment in off-farm agricultural occupations. The purpose of this study was to identify personal and situational variables which inhibit or stimulate the adoption of cooperative agricultural occupations curricula as an innovation in vocational agriculture.

Special gratitude is expressed to David L. Williams' graduate advisory committee for their valuable assistance, guidance, and contributions to this study: Drs. Robert R. Price, Chairman; William L. Hull, John C. Egermeier, and John W. Goodwin.

The authors gratefully acknowledge the contribution of Drs. William W. Stevenson and William D. Frazier of the Vocational Research Coordinating Unit for their assistance and guidance during the course of the study. The helpful cooperation of personnel in the Division of Vocational Agriculture, Oklahoma State Department of Vocational-Technical Education, served to enhance data collection for the study.

Finally, the authors wish to express appreciation for the cooperative attitude of administrators and vocational agriculture instructors who participated so willingly in the study.

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CHAPTER I

INTRODUCTION

A major responsibility of the teacher of vocational agriculture is to provide learning experiences relevant to actual or anticipated opportunities for employment for all high school students enrolled in vocational agriculture. The teacher is charged to keep the instructional program in tune with rapid changes taking place in our dynamic society.

In alluding to changes in education, Lee (35, p. 43) reported that:

> Generally recognized today is the need for accelerated change to keep education programs and practices in tune with demands created by the rapid expansion of knowledge, an intensely competitive society, the expanding population, new ways of living, and the changes created by increasing automation.

John W. Gardner in Self-Renewal--The Individual and the Innovative Society (25, p. 22) suggested that ". . . the pressing need today is to educate for an accelerating rate of change. . . ."

Labor statistics show a consistent trend in the reduction of the need for farmers. Studies completed by state agencies and summarized by the Ohio State Center for Research and Leadership Development in Vocational and Technical Education (60) show the need for non-professional, skilled employees in agricultural businesses. Stevenson (57) identified the greatest increase in numbers of agricultural employees is expected in the areas of ornamental horticulture, agricultural machinery, and agricultural supplies.

Rural youth with farm backgrounds and vocational agriculture training have a comparative advantage for many occupations in agricultural businesses supplying goods and services to farmers. In many farm-related industries some knowledge of technical agricultural subjects and a general understanding of the process of agricultural development are highly desirable. However, the type of training and experience needed are not necessarily the same as that needed in farm employment (18).

The increasing disparity between the scarcity of skilled manpower and the lack of occupational opportunity for unskilled labor in this country has placed stress on educational training systems. Since the 1963 Vocational Education Act, vocational agriculture educators have been under pressure to improve their curriculum offerings to better prepare students for existing and future occupational opportunities in agriculture. Vocational education in agriculture is challenged to keep pace with the changing needs of the dynamic agricultural industry.

The Joint Committee of the U.S. Office of Education and American Vocational Association (32, p. iii) reported that:

> Agriculture is a dynamic and changing industry. It is basic to the progress of America, contributing substantially to our Nation's efforts in maintaining world peace and in helping other nations to maintain democratic stability. In this important role, agriculture requires the services of competent and dedicated workers. Some of these are engaged in production agriculture, or farming; many others work in nonfarm agricultural occupations to provide the supplies and services that farmers need, and to transport and market the product of the farm.

The changing agricultural industry increases the complex educational needs for those who will work in the broad field of agriculture --including not only education for farmers but also for those who will be employed in off-farm occupations which involve knowledge and skills in agriculture. Training students for employment in off-farm agricultural occupations will not replace training in production agriculture, but will supplement and complement such existing programs.

In this regard, Phipps (48, p. 4) stated that:

> In addition to vocational education in agriculture for farming, several other types of agricultural education are needed. Vocational education in agriculture programs for occupations requiring knowledges and skills in agriculture are needed. Our society is becoming increasingly dependent on those agriculturally oriented businesses necessary for the efficient and effective supply of food and fiber products for the exploding population. Many workers in these agriculturally oriented businesses need vocational education in agriculture of special types if they are to make a maximum contribution to the economy of the nation. . . .

From an economist's point of view, Hathaway (28, pp. 84-85) advocated that the:

> . . . demand for farm operators is declining and has been for some time, many rural high schools still offer training in agriculture as the only vocational training. Not only does this prepare those young people who wish to enter nonfarm occupations less adequately than would vocational training oriented toward nonfarm pursuits, but there is also evidence that such training contributes to false expectations about the future income possibilities in farming. Thus, the total educational funds available in rural areas are not used to provide training that will enable the recipients to function better in the nonfarm labor market. The latter is ironic inasmuch as the vocational funds are obtained from federal and state governments, which could reallocate the money if it were deemed desirable. There is, however, great pressure on the part of the teachers involved and on the part of some rural people to continue the allocations for vocational agriculture despite the obvious needs of the economy for persons trained in other fields.

General Background for the Study

In view of the revision of existing programs and the development of new programs in agricultural education at the high school level, Warmbrod and Phipps (69, p. 87) announced that ". . . it is imperative that the re-education and upgrading of teachers and other personnel in agricultural education be given prompt attention."

Mackenzie (39, p. 27), in discussing teacher training, stated that:

> The importance of the teacher in the innovative process is widely acclaimed, and many efforts to innovate place major emphasis on modifying teacher knowledge, values, or skills. This often involves retraining programs--workshops, institutes, or other in-service activities.

In this regard, the Agricultural Education Department, Oklahoma State University, conducted an Institute, consisting of two workshops, during the summers of 1965 and 1966 (31), to train vocational agriculture teachers for conducting cooperative agricultural occupations training programs in secondary schools. The need for agricultural occupations training programs was used as the major criteria for selecting teacher participants. The Institute attempted to introduce instruction in agricultural distribution into the vocational agriculture target system and to reduce the lag between research findings and adoption of new educational practices.

In addition, the Institute attempted to make vocational agriculture teachers aware of the need for change and provided instructions in methods of conducting an agricultural occupations training program.

Evidence available from the Institute indicates the teachers mastered the competencies needed to implement the program. Evaluation of the 1966 workshop showed that participating vocational agriculture teachers acquired a knowledge of distributive education. This gain was statistically significant at the .001 level. It was concluded that there was no reason to believe that the effect of the 1965 workshop on participants was any different (31).

The State Department of Vocational Education has developed policies whereby a vocational agriculture teacher in Oklahoma may initiate a variety of training programs as listed below:

Vocational Agriculture I, II, III, IV
Agricultural Mechanization I
Agricultural Occupations I

Statement of the Problem

The Agricultural Occupations Institute was funded for the express purpose of innovating programs which would prepare rural youth for occupations in agricultural businesses. Vocational agriculture teachers made application to participate in the Institute workshops. They were selected as participants on the basis of their application which was a statement of need for the program in their community. The Institute and the selection of participants assumed that teachers would be able to put the program into effect the following year. Expecting tangible results from Institute instruction presupposed an ability on the part of the teacher to innovate the program in his community.

Therefore, if the innovation was not adopted in the community, it appeared that the teacher was directly responsible. In other words, the lack of adoption can be attributed to the cautious leadership position taken by the vocational agriculture teacher in that community. If the teacher was not responsible for lack of program implementation, situational variables in the school and community must be responsible for discrepancy between the observable fact and the expectations drawn from theory.

Participants basically received the same training and encouragement to adopt the innovation, yet their program outcomes appeared to vary greatly. Simply stated, the problem with which this study was concerned is: Why were these teachers not equally successful? Either these teachers were not innovators, or situational variables in the community were so strong as to retard the adoption of the innovation.

Purpose of the Study

The purpose of this study was: (1) to determine the relationship between teacher innovativeness and diffusion, and (2) to isolate and relate situational variables in the school and community which were associated with deviation from the expected direct relationship between innovativeness of the teacher and diffusion of the innovation. These potential intervening variables included:

A. Administrator's attitude toward cooperative agricultural occupations training

B. The school's per pupil expenditure

C. The number of agricultural training stations available in the community

D. The number of teachers in the vocational agriculture department

E. The number of students enrolled in vocational agriculture

F. The number of non-farm students enrolled in vocational agriculture

G. The number of vocational education programs offered by the school

H. The offering of a separate agricultural mechanics class in the vocational agriculture program

Need for the Study

Evans and Arnstein (22) espoused that history contains some striking examples of the failure of education to be geared to visible and continuous change. Today, this failure could be extremely costly.

In describing the need for research in education, Lee (35, p. 37) used the following words:

> There is today an increasing awareness and sense of urgency for research and development (improvement if you will) in education. In many areas we find persons seeking, striving, straining, clamoring, thirsting, imploring for change to meet the needs of today. This applies to all of education, including most certainly . . . vocational-technical education.

Lee (35) further announced that vocational educators should be willing to adapt to the needs of changing times.

Evans and Arnstein (22, p. 7) advocated that "vocational education has been slow in adapting to changing needs. . . ." Fawcett (23) suggested that vocational-technical education tends to lag behind current vocational practices. Mort and Cornell (46) advanced that to operate schools today in terms of the understanding of past years is a waste of school funds and school time. Adaptability, or the capacity to meet new needs by adopting new purposes and new practices, is indispensable to the effective functioning of any system.

Pearce (47) advocated that many vocational agriculture experience programs, as they exist, are inadequate to meet the needs of young people in agricultural programs. It seems evident that a revision of the experience programs is needed. Baker (3, p. 7) suggested that:

> There are probably a few schools in every state that can justify a completely production-centered curriculum. All others should consider adjusting their curricula to include education for off-farm agriculture occupations. . . .

Baker (3) added that it is a recognized fact that the job opportunities for people with an agricultural education background continue to increase, and that adjusting old and designing new curricula in vocational agriculture is inevitable if the program is to be effective and is to deal efficiently with the dual functions of providing vocational education for both farm and off-farm occupations.

If the adoption and diffusion processes were better understood, teacher educators and supervisors could more effectively plan for teacher pre-service and in-service programs and possibly reduce the traditional time lag between research findings and adoption of new educational practices. This research will also provide information that will be helpful in selecting future Institute participants. It identified and related personal and situational variables which inhibit and stimulate adoption of innovations.

Lee (35, p. 44) suggested that ". . . there is great need for applied research for activities such as program invention, field testing, dissemination, demonstration, and implementation." The adoption of new educational practices which alter the instructional program is a common concern of educators as school systems attempt to provide an adequate education for their clients. Rogers, in Change Processes in the Public Schools (51, p. 71), reported that:

> As the teacher may affect the innovativeness of the school system, so the school system . . . may affect the innovativeness of the teacher. . . . The crucial role of school administrators in causing a school to be more or less innovative warrants special emphasis. . . .

Carlson (8, p. 3) suggested that "all this emphasis on change in school creates a good opportunity for the study of educational innovations. . . ." Warmbrod and Phipps, in Review and Synthesis of Research in Agricultural Education (69, p. 89), advanced that "further research relating adoption-level theory to change and innovation in agricultural education holds promise as a fruitful area of research." Eichholz and Rogers (20) concluded, in contrasting diffusion of innovations in education and rural sociology, that there is need for greater dissemination of diffusion research findings and methods from one tradition to another.

Assumptions Basic to the Study

For the purposes of this study the following assumptions were made:

1. That all teachers in the population were aware of the need for skilled employees in agricultural occupations because of their participation in the Institute.
2. That all teachers in the population received equal training and encouragement to initiate cooperative agricultural occupations training as a part of their vocational agriculture programs.

3. That teachers mastered the competencies needed to implement agricultural occupations training through participation in the Institute.

Definition of Terms

The Institute refers to two workshops conducted at Oklahoma State University during the summers of 1965 and 1966 for the purpose of preparing teachers to conduct cooperative agricultural occupations training programs as a part of vocational agriculture in public secondary schools. The Institute was funded by the United States Office of Education.

Cooperative Agricultural Occupations Curricula refers to training designed to develop competencies needed by individuals preparing to engage in agricultural occupations. Ultimately, it consists of formal instructions in the classroom and on-the-job training in agricultural businesses under the direction of the vocational agriculture teacher.

Agricultural Competencies refers to knowledge, skills, or ability in one or more of the primary areas of plant science, soil science, animal science, agricultural business management, and agricultural mechanization (57).

The Innovation refers to cooperative agricultural occupations curricula as a part of the vocational agriculture program in public secondary schools.

Diffusion Process " is the spread of a new idea from its source of invention or creation to its ultimate users or adopters" (50, p. 299).

Adoption Process is the mental process through which an individual passes from first hearing about an innovation or new idea to final adoption (50).

Adoption Categories refers to the classification of individuals on the basis of innovativeness (50).

Innovativeness refers to the degree to which an individual is relatively earlier to adopt new ideas than others in a social system (50).

Innovation "is an idea perceived as new by the individual" (50, p. 13).

Administrator refers to the school official who was mainly responsible for supervision of the vocational agriculture department. In all cases this was either the superintendent of schools or the high school principal.

Administrator's Attitude is the sum total of the school administrator's ". . . inclinations and feelings, prejudices or fears, thoughts, and convictions about. . ." cooperative agricultural occupations training (62, p. 216).

Non-farm Students refers to students whose parents earn less than fifty percent of the family's net income from production agriculture.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter consists of a review of relevant literature and a discussion of a theoretical framework for the study. In this section, attention will be given to: (1) an innovation in vocational agriculture, (2) methods which have been employed in diffusion and adoption research, and (3) research findings related to diffusion and adoption of innovations.

Innovation in Vocational Agriculture

Innovations entail diffusion of a new idea throughout the target system. The diffusion process is the spread of an innovation from its original source to its ultimate users or adopters. In striving for improvement, a person adopts new methods and new ideas as he becomes aware of them and is convinced of their usefulness in his present situation (50).

Rogers (50, p. 12) suggested that an analysis of the diffusion of innovations consists of four crucial elements: ". . . (1) the *innovation*, (2) its *communication* from one individual to another, (3) in a *social system*, (4) over *time*." Rogers (50, p. 13) described an innovation in the following words:

> An innovation is an idea perceived as new by the individual.

> It really matters little, as far as human behavior is concerned whether or not an idea is "objectively" new as measured by the amount of time elapsed since its first use or discovery. It is the newness of the idea to the individual that determines his reaction to it.

Since agriculture embraces the two major components, farming and non-farm agricultural occupations, a two-tract agricultural education program seems necessary. Programs should be designed as nearly as possible to meet the needs of individual students preparing for or engaged in the various agricultural occupations (68).

The Vocational Education Act of 1963 made it possible for vocational agriculture to provide instruction for all occupations requiring a knowledge of agriculture both on and off the farm. The Act specified that existing vocational agriculture programs are to be expanded and improved. Arnold (1) stated that the greatest need for change is to include training for off-farm agricultural occupations.

The importance of preparing students for agricultural employment off the farm has been emphasized by many statewide studies which provide a picture of the employment opportunities and training needs in agricultural occupations. "Thus, the challenge to education is not only to equip the relatively few farm-bound youth with modern educational tools, but to recognize the needs for that greater number who are industry bound" (44, p. 173). "Many of the workers in these off-farm agricultural businesses need competencies in agriculture" (57, p. 1).

Effective teaching in vocational education depends largely upon observation, fact acquisition, and actual participation in work experience by the student. Baker (3) suggested that the vocational agriculture program should not be evaluated on the basis of the number of students who enter agriculture, but rather in terms of the services which the programs render to the student in the form of educational experiences suitable for occupations.

In this regard, the U.S. Department of Health, Education, and Welfare (65, p. iii) advocated that "vocational agriculture instructors and school administrators are challenged to work with agricultural businesses to develop occupational experience programs that are of maximum benefit in terms of learning. . . ."

The U.S. Department of Health, Education, and Welfare (65, p. 2) further suggested three variations in the meaning of occupational experiences as follows:

> 1. *In general, occupational experience is the students' physical participation in one or more agricultural occupations.* It is participation in performance of the required tasks and in their related responsibilities. . . .
>
> 2. *Occupational experience is a part of the instructional program.* It includes a sequence of learning experiences for students developed and guided under an instructor's leadership. . . .
>
> 3. *Ultimately, occupational experience is learning.* It is the discovery of interest and abilities in relation to agricultural employment. It is the development of skills, abilities, and understandings. It is change in the individual gained by his participation in agriculture.

Educators are challenged to provide occupational experience which is of high quality, appropriate to the needs of youth, realistic in terms of agricultural employment opportunity, and part of a planned logical sequence of instruction in agriculture (65). Traditionally, vocational agriculture programs developed in secondary schools were attuned to production agriculture. The student's occupational experience mainly consisted of a "supervised farming program."

The 1963 Vocational Education Act legitimized the training of individuals for any agricultural occupation in which knowledge and skills in agriculture are involved. The "supervised farming program," a means of "learning by doing," remains as a significant feature of agricultural education programs for many students. However, changes in agricultural employment and education require a revision in the type of occupational experiences provided (65).

Mobley and Barlow (43, p. 197) revealed that:

> The trend throughout the United States is to expand vocational education programs. One of the major reasons for this expansion is the fact that more and more occupations require specialized training, and there are fewer and fewer opportunities for employment on the part of unskilled or semiskilled persons.

Phipps (48) pointed out that if students are preparing for nonfarm jobs requiring knowledge and skill in agriculture, they should also have meaningful observational, participatory, and work experience in these jobs.

A report by the University of Arkansas, College of Education, Department of Vocational Teacher Education (64, p. 2) suggested that cooperative agricultural occupations training has as its primary objective ". . . the development of entry level skill which will enable the student to enter and make satisfactory progress in an occupation of his choice. . . ." The secondary objectives are as follows:

1. To provide an opportunity for the student to apply on the job what he has learned in the classroom.
2. To provide the student with a selection and "try-out" period in various occupations.

3. To provide the student greater assurance of successful full-time employment upon graduation from high school.

4. To provide an opportunity for the student to learn an occupation and earn some income while completing a high school education (64, p. 2).

Technological change in agriculture has resulted in a need to change vocational agriculture education programs. In the field of education, Ross (55, pp. 7, 8) identified three general kinds of forces for change in educational institutions. These changes are:

> (1) Changes in the social setting or environment in which the educational system functions, (2) the growing body of knowledge in most fields, and (3) the growing body of educational innovations.

Each of these forces are beyond the control of any individual school system yet influence the decision made by each. Ross (55) advanced that changes made in response to these forces are adaptive changes.

Hobbs (29, p. 140) reported that:

> . . . one of the reasons why leaders in agriculture education desire to facilitate change is to develop viable programs which take into account the changing social setting and the growing body of knowledge and educational inventions to effectively meet the changing needs of the agriculture education clientele. . . .

The Diffusion Process

In discussing the communication of a new idea, Rogers (50, p. 12) stated that:

> The essence of the diffusion process is the human interaction in which one person communicates a new idea to another person. Thus, at its most elemental level of conceptualization, the diffusion process consists of (1) a new idea, (2) individual A who knows about the innovation, and (3) individual B who does not yet know about the innovation.

The Subcommittee for the Study of Diffusion of Farm Practices (58) suggested that two interrelated processes help bring new ideas from their source of initial development to acceptance by the ultimate user. These processes are called diffusion and adoption and are described as follows:

> The diffusion process refers to the spread of new ideas from originating sources to ultimate users. . . . The adoption process is a mental process through which an individual passes from first hearing about a new idea to its final adoption. . . . (58, p. 3)

The adoption process actually involves decision-making. Rogers (50, p. 78) defined decision-making as a ". . . process by which an evaluation of the meaning and consequences of alternative lines of conduct is made." "Decision-making is thus a process that may be divided into a sequence of stages with different types of activity occuring during each stage" (50, p. 78). Lionberger (36, pp. 3-4) listed and described these stages as follows:

> Awareness - the first knowledge about a new idea, product or practice;
>
> Interest - the active seeking of extensive and detailed information about the idea, to determine its possible usefulness and applicability;
>
> Evaluation - weighing and sifting the acquired information and evidence in the light of the existing conditions into which the practice would have to fit;
>
> Trial - the tentative trying out of the practice or idea accompanied by acquisition of information on how to do it;
>
> Adoption - the full-scale integration of the practice into the on-going operation.

Lionberger (36, p. 4) suggested that "these five stages are not necessarily a rigid pattern followed by all individuals, nor a set of exclusive and discrete categories with no overlap. . . ." They merely represent five sequences that can be clearly identified by researchers. Although there may actually be a greater or lesser number of stages involved in the individual process it has been found that once an idea has been introduced and the process initiated some people can be found at all stages in the process of acceptance (36).

An integral part of the acceptance process is the communication of information at these various stages. Eichholz and Rogers (20, p. 299) stated that "diffusion entails the communication or dissemination of an idea, and culminates in its adoption by individuals."

The observation that people differ in their rate of acceptance and adoption of new ideas and practices has been the subject of major research emphasis in Rural Sociology and related fields during the past two decades (36, 50, 58, 59). Most of their research has been related to farming practices beginning when the individual becomes aware of a new technique and terminating with his decision to either adopt or not adopt the practice.

Research has commonly found that farmers become aware of new practices from mass communications media such as newspapers, radio, and television (13, 40, 50, 58, 59). At this stage the individual is only aware of the innovation and lacks information and details about it. If the innovation has some appeal to the person, he will seek further information. At the interest stage mass media are still important sources of information, but the individual may also seek information from personal sources (11, 50).

After obtaining some additional information, if the person is still interested in the possible application of the innovation, he will seek further information to evaluate the practice in terms of his own situation. In the evaluation stage, personal sources of information such as friends and neighbors who have had some experience with the practice are most frequently sought for information (11, 42, 50).

If on the basis of information secured in the first three stages of the adoption process, the individual feels that the innovation is applicable and of some value in his present situation, he may choose to try the innovation. The trial stage is characterized by small scale experimental use of the innovation. If the results of the trial are satisfactory to the individual he may then adopt the practice and use it on a continuous basis (42, 50).

Ross (55), in a study of 2,416 teachers, discovered that ideas for change come from the following sources: (1) professional literature, (2) teaching experience, (3) observation of other schools, (4) college or university, (5) study of pupil needs and interests, (6) contact with other teachers, (7) summer school, (8) general literature, (9) conventions, conferences, and institutes, and (10) original ideas.

Christiansen (11), in a study of 101 teachers of vocational agriculture in Ohio, discovered that experienced teachers are influenced by different sources of information at the awareness stage, the interest stage, and the adoption stage. The study revealed that the more innovative the teacher, the greater the use he is likely to make of impersonal sources of information and of sources outside of agricultural education, the greater the number of other departments of vocational agriculture as well as other departments of instruction he is likely to visit, and the greater the number of non-local professional meetings he is likely to attend. Other conclusions drawn included: The more innovative the teacher is, the greater the amount of formal education he is likely to have obtained, and the greater the amount of money he is likely to have invested in professional growth.

Miller (42) utilized adoption-level theory to measure the progress made by teachers of agriculture in North Carolina toward the adoption of three new supervised practices. The three concepts included: (1) students may select supervised practice programs from the broad field of agriculture rather than only from production agriculture (farming), (2) students have an opportunity for supervised practice at school (beyond class and shop), and (3) students are provided opportunities to gain supervised practice in each major learning area (such as animal science) in which they study.

At the end of seventeen months, Miller (42) discovered that when the three concepts were considered as a whole, 10.6 percent of the teachers had adopted the innovation; 6.4 percent were at the trial stage; 66.6 percent were at the evaluation stage; and 19.2 percent were at the interest stage.

The Michigan Vocational Education Research Coordinating Unit (67) studied the diffusion of vocational education innovations in Michigan in the areas of Agriculture, Business, Home Economics, and Trade and Industry. The study only used the awareness and adoption stages of the diffusion process.

In the area of agricultural education, 118 schools were included.

The innovations studied and the percent of schools in the awareness and adoption stages are as follows: (1) A land laboratory is owned or rented by the school or FFA. All the schools were at the awareness stage and 88 percent had adopted the innovation. (2) A program which gives students occupational experience in non-farm agricultural occupations is under the supervision of the teacher of agriculture. All schools in the study were aware of this innovation and 78 percent had adopted the new idea. (3) A course with content designed specifically for preparation of students for non-farm agricultural occupations is offered by the school. The study showed 98 percent at the awareness stage and 54 percent at the adoption stage. (4) Girls are allowed to enroll in vocational agriculture on a regular basis. Ninety-seven percent were aware of this innovation and 35 percent had adopted it. (5) Adult or young farmer programs are operated cooperatively by two or more schools. Ninety-one percent were at the awareness stage and 48 percent had adopted the innovation (67).

Diffusion and the Social System

Rogers (50) advocated that a social system is a population of individuals who are functionally differentiated and engaged in collective problem-solving behavior. Rogers (50, p. 14) further stated that:

> . . . The members of a social system are individuals, although these individuals may represent informal groups, industrial firms, or schools. . . . Each of the members in a social system can be differentiated from the others. All of the members cooperate at least to the extent of having some problem which they are seeking to solve.

A majority of the studies of diffusion of innovations has been done in Rural Sociology and directed toward farmers (36, 50, 58, 59). More recently, medical sociologists have made contributions by studying the rates of adoption of medical practice by physicians (36).

In the field of education, a number of studies on the diffusion of innovations have been completed, primarily under the leadership of Paul R. Mort and his associates at Columbia University. Most of the studies pertained to the school system as a unit rather than to the individual teacher (9, 45). Ross (55, pp. 173-174) used the term "adaptability," essentially as a synonym for innovativeness, and defined it as ". . . the capacity of a school to take on new practices and discard outmoded ones."

Hobbs (29, p. 144) suggested that the major difference between adoption of new ideas in education and in farming is that ". . . in education the idea is adopted and applied in a formal organization where the practice affects not only the adopter, but also others in the organization as well as those served by the organization. . . ." Thus, the potential adopter of an innovation in education must take into account not only his own preferences but also the preferences and attitudes of others in the educational structure. Therefore, the decision to adopt or not adopt is not one which can be made by the individual without legitimation from all parts of the system in which he functions (29).

The School Administrator and Diffusion. Estes (21, p. 32) advocated that the first step for educational change is that ". . . a superintendent and his staff need to have some feeling for the weaknesses in their school system. . . ." Gallaher, in Change Processes in the Public Schools (24), suggested that the target system's felt need for change influences the acceptance and rejection of innovations. Demeter (14) reported that school administrators are key figures in improving educational practices. "Where they are. . . aware of and sympathetic to an innovation, it tends to prosper. Where they are ignorant of its existence, or apathetic if not hostile, it tends to remain outside the blood stream of the school" (14, p. 23).

Carlson (8, pp. 10-11), in writing about the role of the school administrator, reported that:

> . . . Though it is true that a school system as a whole accepts or rejects innovations, the school superintendent is at the focal point in the decision process regarding innovations. Whether he convinces his staff or is convinced by them, the superintendent is in a position to make the final decision. . . .

Conant (12) identified school administrators as sometimes being responsible for actually obstructing reform measures being introduced into education. According to Sweatmen (61), the school administrator's role is frequently one of maintaining the status quo rather than acting as a change agent for innovations in education.

Zander (71, p. 11) concluded that "resistance can be expected when those influenced are caught in a jam between strong forces pushing them to make change and strong forces deterring them against making change." Hobbs (29, p. 147) reported that:

> The important consideration from the standpoint of change is that the teacher's and the school administrator's perception of the community's possible reaction to change is used because there is generally a lack of formalized mechanisms to objectively evaluate public reaction prior to making a change. Lacking this information a school administrator or teacher may be reluctant to make changes because they feel the community would react negatively.

> Whether the reaction would be negative or not is somewhat irrelevant if the teacher or administrator believes it would be. . . .

This statement exemplifies that the administrator's attitude toward an innovation will influence adoption. Thurstone (62, p. 216) defined attitude as ". . . the sum total of man's inclinations and feelings, prejudices or fears, thoughts, and convictions about any specific topic."

Since the administrator's attitude toward a new educational practice may influence adoption, it is necessary that he be actively involved in implementing the innovation. In this respect, Zander (71) reported that there is least resistance to organizational change when the persons affected have been involved in making the change. Hull et al. (31, p. 34) concluded that ". . . the major weakness of the Institute procedure was the failure to involve more administrators in the program innovation." Dupy and Hull (17) reported that securing administrative approval was one of the problems perceived by teachers in setting up agricultural occupations training programs.

Brickell (6) concluded that for innovations to be adopted by a school system, it is necessary to convince administrators of their value. Unless the administrator gives his attention and actively promotes an educational innovation, it will not come into being. Hull (30, p. 79) advanced that an administrator who is ". . . sympathetic to innovative behavior provides an important impetus to a quality program of vocational education."

Cooperation of Industry and Business in Education. Educational preparation of students for agricultural employment requires the cooperation of industry and business in the community. In outlining the responsibilities of educators in seeking educational support from industry, Burt (7, p. 223) suggested that:

> . . . industry offers services, its time, its personnel, and its funds in vain unless local educators exercise the necessary leadership in channeling and utilizing industry's interests and efforts.

Burt (7, p. 233) further advocated that:

> Industry wants to become involved in occupational education programs in the school because: (1) they would like to have the school system assume the burden of costs of initial job-entry training of new employees, as well as the skill upgrading of currently employed personnel; (2) they would like to have a reliable source for a continuing supply of well educated new employees in order to reduce their costs of recruitment and selection; (3) they would like the prestige which accrues to the industry as a result of having a program in the school; (4) they consider their work with school as fulfilling a community public service responsibility; (5) they seek the opportunity to engage in an educational activity that provides them, as individuals, with some measure of prestige among their associates, neighbors, friends, and inner family circle; (6) they may satisfy their desire to be considered altruistic and philanthropic by providing prizes, awards, and financial aid to young people; (7) they desire to take advantage of such public and customer relationships as may result from participating in educational programs; (8) they are satisfying a personally felt moral and social responsibility for helping young people prepare themselves to become productive and useful citizens; and (9) they believe that the industry they represent can provide young people with interesting and worthwhile career opportunities, and they want to help young people just as they themselves were assisted when seeking a career. Recognition of these motivating factors can provide educators with innumerable clues for developing greater participation and involvement of industry people in school programs.

Rivlin (49, p. 9), in looking at vocational education from the economist's point of view, suggested that:

> Where the training involves learning to operate expensive equipment, there are advantages to doing it on the job

> (or at least on the premises of a good commercial or industrial establishment). . . . Moreover, when the rate of technological change in an industry is high, there tends to be advantages to on-the-job training. Both teachers and equipment may be subject to rapid obsolescence, and a school may quickly find itself turning out students whose training is largely irrelevant to the work situations they will face.

Mason and Haines (41) advanced that by involving business and industry in the educational program, schools are expanding their curriculum beyond the four walls of the school, recognizing that the community can be a classroom. Gardner (25, p. 12) advanced that educational institutions will not fully utilize industry in training programs ". . . until we get over our odd conviction that education is what goes on in school buildings and nowhere else. . . ."

Hull et al. (31, p. 35) related that:

> A direct relationship existed between size of community and the number of agricultural businesses available to be used as training stations: the smaller the community, the fewer the training stations. Consequently, a vocational teacher in a small rural community is severely limited in the implementation of a cooperative occupational experience program.

In discussing occupational education, Venn (66, p. 16) reported that:

> . . . if our educational system is to continue to be the chief source of preparing youth for the world of work, it must assume the responsibility for helping youth make the transition from school to work. . . . Schools should recognize the value of developing good work attitudes and habits that will stand their students in good stead in the future, and should give credit for work experience.

The Teacher and Diffusion. The school administrator is not the only individual that affects the innovativeness of the school system. Rogers (51) advocated that an individual teacher influences the innovativeness of the school system. Allowing teachers to attend out-of-town educational meetings, workshops, and conferences where they may be exposed to new ideas, may be a wise investment for initiating change.

Hull (30, p. 79), in analyzing the implementation of cooperative education in agriculture in four states, espoused that the key ingredient of each effort was a dedicated aggressive teacher who organized departmental resources to improve the instructional content of his program. Gallaher (24, pp. 43-44) suggested that:

> . . . the better teachers in a given school are more likely to accept innovations than the poorer ones; the more educationally secure members of the client group are more likely to accept innovations. . . .

Glines (27, p. 167) suggested that the strategy for change is simple if the ". . . school's administrator encourages innovative teachers to innovate. Once this occurs, good teachers find their motivation in personal satisfaction derived from using more effective ways of teaching. . . ." McComas (38) in a study of the role of vocational agriculture teachers, found that effective teachers of agriculture and their administrators were in agreement concerning the role expectations of teachers.

Chesler and Fox (10, p. 26), in writing about teacher-peer relationships and educational change, reported that:

> Data indicate that teachers need to feel involved and potent in their organization in order to support educational change; they must know that they have the backing of their fellow teachers and their administrators if they are to be willing to try new ideas. These findings make sense. Since change may involve public attention and risk, teachers who feel that they do not have the backing of their colleagues are less likely to go out on a limb than more secure teachers.

Not only does a teacher need to feel involved and potent in the total school system in order to initiate change, but he must feel capable to perform in a new role if required by the innovation. In this regard, Dinkmeyer (15, p. 11) advanced that:

> There is increasing evidence of the significance of an individual's self-image relative to the adequacy of his functioning. If the individual does not feel capable, or is uncertain about his responsibilities, he is not effective. Security comes from understanding one's role and having confidence in one's ability to play it well.

A single vocational teacher in a small school system is faced with the need to have competencies in many areas. If a teacher is to provide a diversified program to meet the needs and interests of all students, he must feel capable in all areas to be effective in his teaching. Baker (3, p. 7) proposed that:

> . . . the small rural high school with its limited faculty has always been confronted with the problem of providing adequate educational experiences to meet the needs of its students. So it will be with the single-teacher departments of vocational agriculture in the future. A number of problems are being encountered by teachers in single-teacher departments who are trying to design comprehensive and diversified programs for agricultural occupations. . . .

In regard to change and individual competencies, Gardner (25, p. 52) announced that ". . . many an established specialist fears the loss of his reputation if he ventures beyond the territory where he has proven his mastery. . . ."

Lancaster (34) reported that when a cooperative program is started in a full-time department, there should be a second man designated for agricultural occupations training with every afternoon free for supervision of students on the job. Binkley (5, p. 14) advocated that ". . . all people that have a part in developing a program in nonfarm agricultural occupations should exert their influence to see that the teacher is provided enough time to do the job well."

Hull et al. (31, p. 35) reported that "multiple-teacher departments tended to enhance the implementation of a separate class to teach agricultural distribution. . . ." Dupey and Hull (17) concluded that multiple-teacher departments have more time to add new programs to the curriculum of vocational agriculture than single-teacher departments.

In regard to the teacher's role, Wilson (70) argued that his role must become more diffuse at a time when most professional roles are becoming more specialized. The role of vocational agriculture teachers is characterized by offering training in diversified areas. Since the passage of the 1963 Vocational Education Act, not only have teachers been encouraged to implement cooperative agricultural occupations training in their program, but also to expand agricultural mechanics training. Single-teacher departments of vocational agriculture are caught in a dilemma of choosing the direction of expansion. If a teacher offers a separate course in mechanics, he may find it difficult to schedule cooperative agricultural occupations training.

Adoption of an Innovation Over Time

Everyone does not adopt a new idea or practice at the same time. The difference between individuals in terms of their time of adoption of certain practices has been used to categorize individuals into adopter categories. Adoption is slow at the initial start and increases until approximately half of the potential adopters have accepted the change. After this, acceptance continues but at a decreased rate. It has been found that the adoption pattern for most practices tends to follow a normal curve (50, 51).

Standard scores have been used to classify individuals accepting innovation in terms of time of adoption as innovators, early adopters, early majority, late majority, and laggards. The first 2.5 percent (2 standard deviations above the mean) have been referred to as innovators; the next 13.5 percent (from 1 to 2 standard deviations above the mean) as early adopters; the next 34 percent (from 0 to 1 standard deviation above the mean) as early majority; the next 34 percent (from 0 to 1 standard deviation below the mean) as late adopters; and the last 16 percent (more than 1 standard deviation below the mean) as laggards (8, 50, 51, 52). This pattern has been observed for a wide variety of farm practices (50, 51, 52) and among schools, school administrators, and teachers (45, 50, 51).

Depending on the innovation, its communication from one individual to another, and the social system, the time required to adopt a new practice or idea may take as little as a few hours or as much as several years. With such practices as hybrid seed corn and 2, 4-D, adoption period (from awareness to adoption) took as much as 10 - 15 years for some farmers (50, 52). In regard to education, Ross (55) pointed out that the adoption period for some educational innovations may be as long as 50 years. Carlson (9) reported that changes have been accepted more rapidly in other sectors such as agriculture and medicine than in education.

Carlson (9) advocated that rapid adoption of educational innovations are inhibited because of the absence of a change agent, a weak knowledge base, and domestication of the public school. The absence of a change agent in a local school system demands that the administrator and teacher take a more active role in advancing innovation. Carlson (9, p. 4) defined a change agent as:

> . . . a person who attempts to influence the adoption decisions in a direction he feels is desirable. He is a professional who has as his major function the advocacy and introduction of innovations into practice.

In addition to the absence of a change agent, local educators are frequently faced with a lack of knowledge about specific innovations. Tope (63) advocated that local educators must be more alert and more sensitive to national needs and interests which affect the school.

Domestication of public schools is also a barrier to change. In some organizations the clients are free to accept or reject the services provided; but, with the school the client must accept the services afforded (9). Carlson (9, p. 6) stated that schools:

> . . . do not compete with other organizations for clients, in fact, a steady flow of clients is assured. There is no struggle for survival for this type of organization--existence is guaranteed. Though this type of organization does compete in a restricted area for funds, funds are not closely tied with quality of performance. These organizations are domesticated in the sense that they are protected by the society they serve. . . .

The above statement suggested that funds are not closely tied to performance. However, there are some indications that the economic base of the school district does influence the rate of adoption of innovations. Carlson (9, p. 7), in summarizing over 100 studies done on adoption of educational innovations, stated that the:

> . . . school systems that are first to adopt educational innovations spend the most money per child and those last to adopt educational innovations spend the least amount per child.

Christiansen (11), in a study of vocational agriculture teachers in Ohio, discovered that the more innovative the teacher, the greater the likelihood that he would be teaching in a school with a relatively high instructional expenditure per pupil.

Hobbs (29) announced that innovation in education involves change in the school system. Every system has norms for guiding behavior. The introduction of an innovation usually results in a change in these norms. Therefore, an innovation results in a deviation from existing methods; hopefully, to a more efficient means of achieving the objectives of the system.

Barnett (4) suggested that for change to take place there must be some way of providing rewards to the adopter. In farming, the individual who adopts new technology in his operation expects to increase his profits. However, in the educational system, there are few, if any, rewards provided to encourage individuals to innovate (20). Hull et al. (31) reported that there was a lack of incentive for Institute participants to adopt the agricultural distribution program in the local high school during the implementation stage.

Hobbs (29) reported that vocational agriculture teachers may be reluctant to introduce changes because they feel the community would react negatively. Therefore, the teacher may find himself in a cross pressure which frequently results in a resistance to change. The pressure placed on the teacher may be reduced if he involves others in the community in the initial planning.

Bail and Hamilton (2) made a study of 10 New York High Schools to identify the innovative procedures and practices followed by schools in initiating off-farm agricultural occupations training. Their recommendations for planning a program and perhaps speeding the rate of adoption of off-farm agricultural occupations included:

1. Use surveys as a means of assessing interest and as an informational tool to acquaint students and the public with the new programs.
2. Use State Department of Education personnel in planning new programs.
3. Use planning sessions to involve administrators, school board, advisory board members, teachers, guidance personnel, parents, and employers.
4. Use visits to successful programs by planning committee.
5. Inform local dealers of the specialty being innovated.
6. Involve employers in planning work experience programs.
7. Provide adequate facilities.
8. Inform and involve the community in planning and conducting the program.
9. Base program on employment opportunities in the community or nearby areas.
10. Designate one teacher as coordinator to keep work experience under control of the school.

Linson (37, p. 111), in discussing rate of adoption, emphasized that:

> . . . people generally are slow to accept new practices unless they are observed in situations similar to their own. The smaller farmer is inclined to believe that new practices on large farms may not be applicable on his farm. School administrators in a small district may

> follow the same reasoning in rejecting a new practice which is successful in a larger or wealthier district.

According to Hobbs (29), one of the reasons for slow adoption in education is that many innovations involve non-material change. This type of change is more difficult to communicate, requires a change in behavior of adopter, and the results are difficult to evaluate.

Rogers (50, p. 19) used the term "innovativeness" to describe the ". . . degree to which an individual is relatively earlier in adopting new ideas than other members of his social system. . . ." The time at which an innovation is adopted is a measure of both innovativeness and classification of individuals into adopter categories (50). Rogers, in Change Processes in the Public School (51, p. 58), stated that:

> The description of innovators is sharpened by contrast to that of laggards, who are the last to adopt an innovation. . . . Laggards are localists; many are near-isolates. Their point of reference is the past, and they interact primarily with those peers who have traditional values like theirs. Laggards tend to be frankly suspicious of innovations, innovators, and change agents. When laggards finally adopt an innovation, it may already be superseded by another more recent idea which the innovators already are using. While innovators look to the road of change ahead, the laggards gaze at the rear-view mirror.

Rogers (51, p. 58-59) further enumerated the general characteristics of innovators as follows:

> 1. Innovators generally are young. . . .
>
> 2. Innovators have relatively high social status, in terms of amount of education, prestige ratings, and income.
>
> 3. Impersonal and cosmopolite sources of information are important to innovators. . . .
>
> 4. Innovators are cosmopolite. . . .

5. Innovators exert opinion leadership. . . .

6. Innovators are likely to be viewed as deviants by their peers and by themselves. . . .

Summary

The review of literature has identified a number of factors relating to this study. However, this does not imply that the factors included comprise an exhaustive list.

The adoption and diffusion processes were discussed and research relating to the change process has been cited. Potential intervening variables in the diffusion process identified by the literature are: (1) innovativeness of the teacher, (2) school administrator's attitude, (3) school's per pupil expenditure, (4) availability of agricultural training stations in the community, (5) number of teachers in the vocational agriculture department, and (6) the offering of a separate agricultural mechanics class.

Hypotheses

The hypotheses which were tested in the study include the following:

1. Teacher innovativeness is related to diffusion of cooperative agricultural occupations curricula. (Figure 1 illustrates the theory for the hypothesis.)

2. Administrator's attitude toward cooperative agricultural occupations training is related to diffusion of cooperative agricultural occupations curricula.

3. School's per pupil expenditure is related to diffusion of

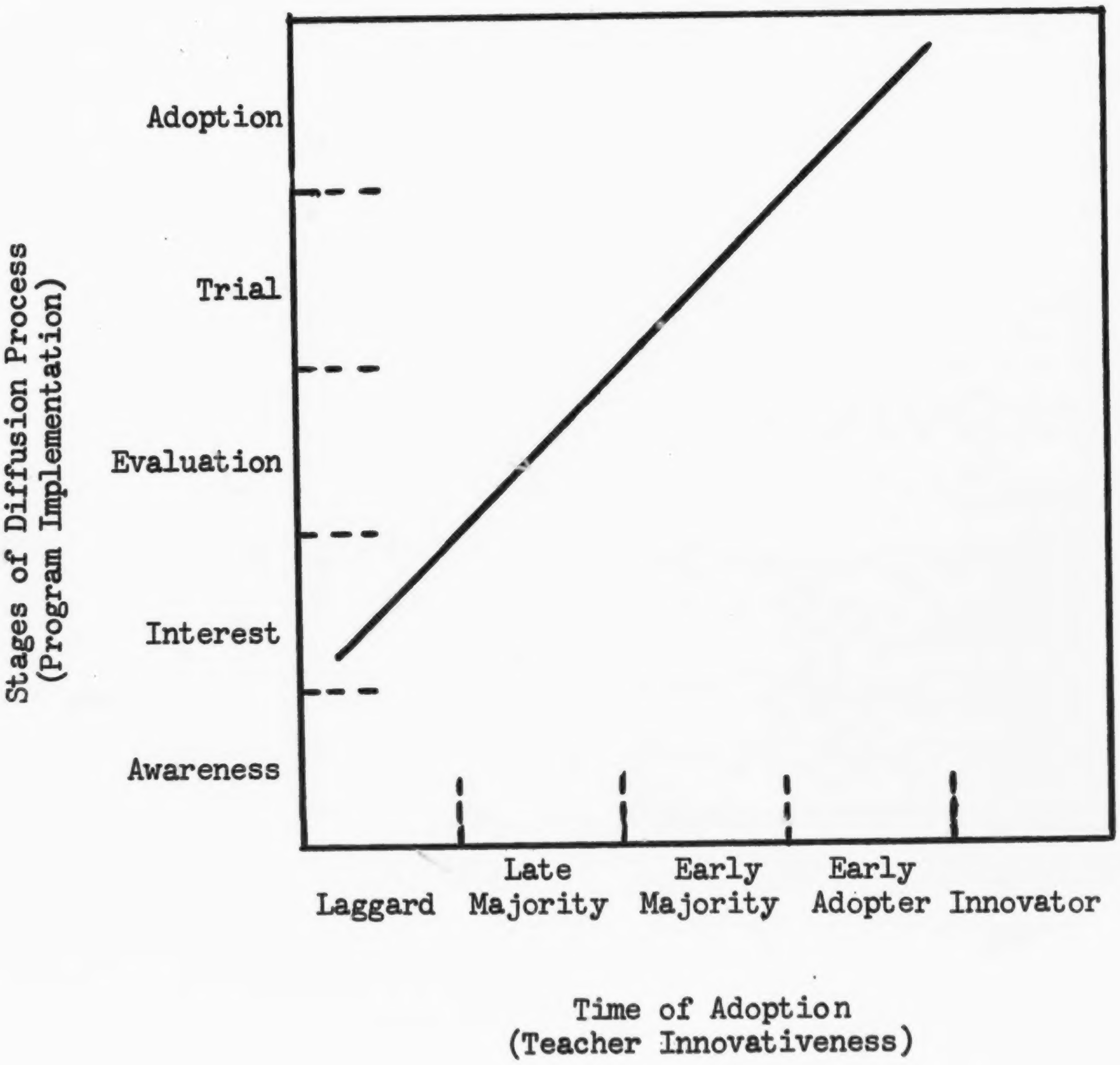

Figure 1. Diffusion-Adoption Model[a]

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[a] The diffusion-adoption model hypothesizes that teacher innovativeness is primarily responsible for incorporation of the innovation into the program.

cooperative agricultural occupations curricula.

4. The number of agricultural training stations available in the community is related to diffusion of cooperative agricultural occupations curricula.

5. The number of students enrolled in vocational agriculture is related to diffusion of cooperative agricultural occupations curricula.

6. The number of non-farm students enrolled in vocational agriculture is related to diffusion of cooperative agricultural occupations curricula.

7. The number of teachers in the vocational agriculture department is related to diffusion of cooperative agricultural occupations curricula.

8. The offering of a separate agricultural mechanics class in the vocational agriculture department is related to diffusion of cooperative agricultural occupations curricula.

9. The number of vocational education programs offered by the school is related to diffusion of cooperative agricultural occupations curricula.

7

CHAPTER III

DESIGN AND METHODOLOGY

The primary objective of this investigation was to isolate and relate personal and situational variables in the school and community which were associated with diffusion of cooperative agricultural occupations curricula.

The purpose of this chapter is to describe the design of the study, the method by which the population for the study was determined, and the method of data collection and analysis.

Design

The design for this investigation was basically an ex post facto design. Kerlinger, in Foundations of Behavioral Research (33, p. 360), stated that:

> Ex post facto research may be defined as that research in which the independent variable or variables have already occurred and in which the research starts with the observation of a dependent variable or variables. He then studies the independent variables in retrospect for their possible relations to, and effects on, the dependent variable or variables.

Kerlinger (33, p. 371), in discussing the limitation of ex post facto research, cautioned that:

> Ex post facto research has three major weaknesses. . . (1) the inability to manipulate independent variables, (2) the lack of power to randomize, and (3) the risk of improper interpretation.

Despite these weaknesses, ex post facto research is valuable in the field of education. Kerlinger (33, p. 372) used the following words to describe the value of ex post facto research:

> Despite its weakness, much ex post facto research must be done in psychology, sociology, and education simply because many research problems in the social sciences and education do not lend themselves to experimental inquiry. . . .

A "follow-up" investigation normally involves ex post facto research. Sharp and Krasnegor, in The Use of Follow-Up Studies in the Evaluation of Vocational Education (56, p. 1), commented that:

> Follow-up studies involve research design which require a contact with individuals who have shared an experience in the past and whom the researcher desires to study or restudy. The usual goal of such studies is to arrive at some measure of the impact of the experience on the subsequent behavior or status of these individuals.

The Population

The population for this study was the sixty vocational agriculture teachers who attended one of the Agricultural Occupations Institute workshops at Oklahoma State University during the summers of 1965 or 1966 (31). To conserve expenses and maintain area validity, the teachers included in this study were the thirty-eight Oklahoma teachers participating in the two workshops. The population was further limited to the Oklahoma teachers who were still teaching vocational agriculture in the same school as they were when enrolled in the Institute. Therefore, the population of the study included thirty-two teachers, school administrators and schools. A list of schools included in the study and a map showing their geographic location appears in Appendix A.

Of the six Oklahoma vocational agriculture teachers excluded from the study, five remained in the vocational agriculture system. Two moved up to positions of teacher educators in agriculture, one became a district supervisor of vocational agriculture, and two accepted vocational agriculture teaching positions in other high schools. The sixth man became an agricultural products salesman. One teacher resigned his position while the study was in progress. However, since he was teaching when the investigation was initiated, and since he had equal opportunity to adopt the innovation, he was retained in the study.

Instrumentation

The study required the development of five data-gathering instruments to be used in personal interviews. The instruments constructed and the procedures followed in their development are discussed below:

Teacher Interview Schedule. This questionnaire included fifteen open-end items. In addition to personal data, the instrument was used to gather data relating to the vocational agriculture department and the community.

Diffusion Scale. This thirteen item scale provided a means to measure the degree of diffusion of the innovation (cooperative agricultural occupations curricula into the vocational agriculture program). In effect, this scale was designed to measure the nature and extent of innovation diffusion into the program incurred in and beyond the formal classroom. Each item was conceived as mutually exclusive and independent of other items.

To select the items for the diffusion scale, thirty-six statements were formulated with each item describing one aspect of the innovation. A jury of individuals knowledgeable of cooperative occupations training and the diffusion-adoption process was used to obtain ratings on each item. The jury included the following individuals:

Dr. Bill Stevenson, Director, Vocational Research Coordinating Unit of Oklahoma, Oklahoma State University.

Mrs. Lucille Patton, Teacher Educator, Distributive Education, Oklahoma State University.

Dr. Harold Cushman, Teacher Educator, Agricultural Education, New York State University.

Dr. James Christiansen, Teacher Educator, Agricultural Education, Texas A & M University.

Dr. T. R. Miller, Teacher Educator, Agricultural Education, North Carolina State University.

The five member jury classified each item along a diffusion continuum considering equal intervals between points designated by number 1, 2, 3, 4, and 5. Classifying an item in the number 1 category meant that it exemplified conditions in a situation where only the earliest attempts were made to diffuse the concept into the program. Rating an item as number 5 meant that schools meeting this criteria have completely incorporated the innovation into their program.

Items were selected from each section of the continuum depending upon the extent of agreement among the raters. The thirteen items selected for the diffusion scale included the ones with greatest agreement among the judges (responses were contained in three adjacent categories or less). Three items were selected as classroom exemplars, five items as school system exemplars, and five items as community exemplars. A mean rating for each of the thirteen items was determined by averaging the judges' responses. Items included in the diffusion scale and their weighted values appear in Appendix B.

Through a personal interview with each teacher in his vocational agriculture department, each program received credit (mean rating) for items exemplifying its situation. In this manner, a total score representing the extent of innovation diffusion into the total vocational agriculture program was derived for each department.

Teacher Innovativeness Scale. The teacher innovativeness scale, including sixteen items, provided a means to determine teacher innovativeness when adopting new ideas.

Rogers (50) postulated that innovativeness scales provide a means of measuring the degree to which an individual is relatively earlier to adopt new ideas and practices than other members of his social system. An innovativeness scale, commonly referred to as a time scale, was developed by Mort and Pierce in 1947 that consisted of new educational ideas. A scoring system was developed that gave numerical credit for earlier adoption of an idea.

Rogers, Havens, and Cartano (53) announced that scales for measuring innovativeness should (1) contain a minimum of fourteen items; (2) take into consideration the number of innovations adopted; (3) consider the relative time of adoption; (4) include items that most of the respondents could adopt; and (5) include a correction factor for specific items that do not apply to all situations.

The initial step in constructing the innovativeness scale was to identify educational innovations to be included. Practices included in the innovativeness scale were selected on the basis of the following criteria:

1. The practices were ones that could be adopted by the teacher rather than by the institution.
2. The practices were ones which would not be perceived as a major threat to existing practices.
3. The teacher was free to adopt or reject the practice himself without having to consider superior approval, budgetary limitations, school policies, or class schedule.

To identify possible innovations for use in the investigation, district supervisors of vocational agriculture, agricultural teacher educators, and graduate students in agricultural education were asked to relate educational practices that have been introduced into the vocational agriculture target system during the previous five years. The five-year limitation was used at this time to attempt to identify recent practices introduced into the vocational agriculture sector in Oklahoma. However, responses from the trial group indicated that some practices were included which had been initiated more than five years before.

From these sources twenty-four practices were identified. These practices were then given to a trial group consisting of fifteen experienced Oklahoma vocational agriculture teachers. In obtaining responses from the trial group, they were instructed to indicate:

(1) the year they first used the innovation if they have adopted; (2) that they have not used the innovation and that it is not applicable to their situation; or (3) that the innovation is applicable to their situation but they have not adopted it. The "not used and not applicable" response would indicate that a practice does not apply to the individual's situation, e.g., a practice pertaining to agricultural mechanics could not be adopted by a teacher who does not have a shop.

The practices selected for inclusion in the innovativeness scale were the ones that were most frequently identified by the trial group as not being adopted but applicable. The final innovativeness scale consisted of sixteen practices with three possible responses for each item: (1) the date the innovation was first used, (2) the innovation does not apply, or (3) the innovation has not been adopted, but does apply.

In recognition of the fact that teachers could not recall the exact year of adoption of each practice, the teachers were asked to indicate if the year given for adoption was only an estimate. This information gave some indication of the accuracy of the dates of adoption. The apparent inability of respondents to recall accurately the year of adoption of practices creates a weakness in the use of adoption scales (54).

To determine the innovativeness score for each teacher, a procedure developed by Christiansen (11) for use in a study of the adoption of educational innovations among Ohio teachers of vocational agriculture was used. Therefore, an innovativeness score for each teacher was determined using the following formula (11, p. 56):

$$IS = \frac{tla + tlp}{Na} \times \frac{Mle}{Ye}$$

Where:

tla: time lag expressed in years for all practices adopted by the individual teacher
tlp: time lag penalty in years for remaining practices not adopted which could have been adopted
Na: number of practices actually adopted
Mle: maximum length of experience of any teacher investigated
Ye: years of experience possessed by the individual teacher

In explaining this procedure, Christiansen (11, p. 55) stated that:

> The innovativeness score for each teacher equalled the summation of the time lag expressed in years for all practices adopted plus the summation of a time lag penalty expressed in years for each practice not adopted which could have been adopted divided by the sum of the number of practices adopted, the resulting figure, or base score, multiplied by an equalization factor.
> An equalization factor was necessary to prevent the teacher who began teaching most recently from receiving undue credit for practices already adopted when in reality (1) we did not know which of the remaining practices not currently adopted would be adopted in the future and (2) if they were adopted, what time lag would occur between the date when the practice could have been adopted and the date it actually would have been adopted. On the other hand, it was possible to collect this information for teachers who had been teaching for several years.

The equalization factor was based on the fact that four years was the shortest length of experience of any teacher in the study and thirty-three years was the longest length of experience of any teacher. For example, a teacher who had taught ten years would have an equalization factor of 33/10 or 3.3. A teacher who had taught twenty years would be assigned a factor of 1.65.

To use this procedure for determining innovativeness scores it was necessary to establish a definite date when each practice became generally available to Oklahoma teachers of vocational agriculture. To accomplish this, a panel of judges consisting of teacher educators and vocational agriculture supervisors was used. The panel generally agreed that nine of these practices could have been initiated by a teacher any time after he began teaching. The dates when the remaining seven practices became generally available to Oklahoma vocational agriculture teachers were identified by the judges as follows:

1. Using testing equipment for quality control in welding--1963
2. Using a system of color dynamics as a safety measure in the shop--1962
3. Maintaining a file describing employment opportunities available in the broad field of agriculture--1945
4. Including instructions in small air-cooled engines as a part of the curriculum--1960
5. Using the station method of teaching agricultural mechanics--1952
6. Maintaining an organized file of transparencies to be used in teaching--1960
7. Using a labeling system to identify location of items in the shop and/or classroom--1950

Administrator Interview Schedule. This questionnaire included eight open-end items designed to assess personal data and independent variables related to the school system.

Administrator's Attitude Scale. Edwards (19) suggested that an attitude scale provides a quick and convenient measure of attitude. Edwards (19, p. 9) further advocated that:

> . . . Attitude scales also provide us with one means of obtaining an assessment of the degree of affect that individuals may associate with some psychological object.

A Likert-type scale was constructed following the procedure outlined by Edwards in Techniques of Attitude Scale Construction (19), to measure the attitude of the school administrator toward cooperative agricultural occupations training. Since each response to a statement may be considered a rating and because these are summated over all statements, the Likert method of scale construction has been commonly called the method of summated ratings. For each subject, a total score was obtained by summating his scores for the individual items.

Following a review of relevant literature, thirty-nine statements concerning cooperative agricultural occupations training were made. The statements were classified into two classes: favorable and unfavorable. (See Appendix B). The scale was statistically validated by obtaining responses from sixty-four undergraduate students enrolled in Agricultural Education 3103 at Oklahoma State University during the fall semester of 1967-68. In obtaining responses from the trial group, they were instructed to mark each statement as strongly agree, agree, undecided, disagree, or strongly disagree.

These categories of response were weighted so that the response made by individuals with the most favorable attitudes received the highest possible weight. For the favorable statements, this was the "strongly agree" category, and for the unfavorable statements it was the "strongly disagree" category. A total score was obtained for each subject by summating his scores for the individual statements.

To evaluate the individual statements, twenty-five subjects with the highest total score and twenty-five subjects with the lowest total score were selected and the frequency distribution for each statement in each group determined. As a basis for rejecting statements in the scale a form of item analysis, the t test, was utilized to select the statements that differentiated between the high and low groups. Edwards (19, p. 153) stated that:

> The value of t is a measure of the extent to which a given statement differentiates between the high and low groups . . . we may regard any t value equal to or greater than 1.75 as indicating that the average response of the high and low groups to a statement differs significantly, providing we have 25 or more subjects in the high group and also in the low group.
>
> In the method of summated-rating, what is desired is a set of 20 to 25 statements that will differentiate between the high and low groups. . . .

The 22 statements selected for the attitude scale had a t value of 1.80 or greater. (See Appendix B).

Edwards (19) reported that the reliability coefficient typically reported for scales constructed by the method of summated-rating are above .85, even when fewer than twenty items make up the scale.

Since this research was conducted pursuant to a contract with the United States Office of Education, it was necessary to secure government approval for the use of all instruments constructed. This approval was granted March 29, 1968.

Collection of the Data

Each teacher included in the study and his administrator were informed of the study by letter (see Appendix C) which requested their cooperation. The investigator scheduled preliminary visits with each teacher and administrator in their local school to explain the purpose of the study and the significance of their participation. These visits also served to establish rapport among the respondents which enhanced communications when the interviews were made.

The investigator visited each school during the months of March and April, 1968, to collect data for the study. Each teacher was interviewed in his vocational agriculture department using the Teacher Interview Schedule, the Diffusion Scale, and the Innovativeness Scale. The personal interview and the visit in the department permitted the investigator to observe practices being used by the teacher which were relevant to the study.

The school administrator interviewed was the school official identified by the local superintendent of schools as being mainly charged with supervision of the vocational agriculture department. In all cases this was either the superintendent of schools or the high school principal. The Administrator Interview Schedule was completed by the researcher during a visit with the administrator. The Administrator's Attitude Scale was completed by the administrator in the presence of the researcher.

A copy of the instruments used in the study appear in Appendix D.

Analysis of Data

The following brief description of the analysis procedure is included to provide for the reader an overview of the statistical treatment of the data collected.

Stepwise regression, a method of multiple regression calculation, was used in analyzing the data. Stepwise regression, as explained by Draper and Smith (16), included: (1) the computation of simple correlation matrix, (2) the computation of partial and multiple correlation coefficients, and (3) the formulation of a multiple regression equation.

This analysis procedure permitted the organization of an intercorrelation matrix to show relationships among all variables considered in the study. A second part of the analyses was a test of the hypotheses of the study. This was accomplished by the application of the appropriate coefficient of correlation which indicates the relationship existing between each independent variable and diffusion of cooperative agricultural occupations curricula.

The third part of the analyses was the computation of partial and multiple coefficients of correlation between the optimum composite of predictive variables and the criterion (diffusion of cooperative agricultural occupations curricula).

The final part of the analyses was the formulation of a multiple regression equation, the purpose of which will be to predict diffusion of cooperative agricultural occupations curricula into a vocational agriculture program.

CHAPTER IV

RESULTS

The purpose of this study was to: (1) determine the relationship between teacher innovativeness and the diffusion of cooperative agricultural occupations curricula into the vocational agriculture program, and (2) isolate and relate situational variables in the school and community which were associated with deviation from the expected direct relationship between innovativeness of the teacher and diffusion of the innovation. Results of analyses of the data utilized in this investigation are presented in this chapter. Conclusions and recommendations based on the results are presented in Chapter 5.

The analyses are presented in four sections, including the following: (1) the computation of zero order coefficients of correlation among all variables included in the study; (2) a test of the hypotheses of the study and an analysis of relationships; (3) the computation of partial and multiple coefficient of correlations between the optimum composite of predictive variables and the criterion; and (4) the formulation of a multiple regression equation that might be used in predicting the probable level of diffusion of cooperative agricultural occupations curricula into a vocational agriculture program.

Intercorrelations Among All Variables Considered in the Study

The first part of the analyses of the study was the computation of zero order coefficients of correlation among all variables considered in the study. Table I shows the intercorrelations of the independent variables and dependent variable for the data obtained from the thirty-two schools included in the study.

A coefficient of correlation of .449 is significant at the one percent level of confidence, and a coefficient of .349 is significant at the five percent level of confidence for the number of cases considered in the study. In the intercorrelations table, involving forty-five correlations, eight correlations are significant at the one percent level of confidence, two are significant at the five percent level of confidence; and thirty-five correlations are not sufficiently large to be significant at the five percent level of confidence, which was the lowest level of confidence accepted.

The four independent variables that had a simple correlation with diffusion which were significant at the .05 level of confidence or better are, in order of degree of correlation: the number of vocational agriculture teachers employed by the school, the number of students enrolled in vocational agriculture, innovativeness of the teacher, and the number of non-farm students enrolled in vocational agriculture.

The number of vocational agriculture teachers employed by the school was most closely related to diffusion of cooperative agricultural occupations curricula into the program. The coefficient of

TABLE I

INTERCORRELATION AMONG ALL VARIABLES INVESTIGATED IN THE STUDY

Variables	(Refer to Numbered Variables at Left of Table)									
	1	2	3	4	5	6	7	8	9	10
1. Diffusion		-.510**	.136	-.176	.344	.585**	.465**	.603**	.157	.200
2. Teacher Innovativeness			-.122	.059	-.262	-.221	-.139	-.217	-.344	-.121
3. Administrator's Attitude				.145	.135	-.221	-.252	-.012	.263	-.054
4. Per Pupil Expenditure					-.290	-.133	-.291	.033	-.046	-.165
5. Training Stations						.273	.254	.267	-.133	.460**
6. Vocational Agriculture Enrollment							.823**	.828**	.433*	.215
7. Non-Farm Enrollment								.515**	.248	.170
8. Teachers in Department									.375*	.292
9. Agricultural Mechanics Class										.032
10. Vocational Education Programs										

** Significant at the .01 level
* Significant at the .05 level

correlation was .603, which is significant at the one percent level of confidence.

Innovativeness of the teacher was also closely related to diffusion. The coefficient of correlation was -.510, which is significant at the one percent level of confidence. This correlation is negative because the lower the score, the more innovative the teacher. In other words, innovativeness is the average length of expired time (years) for a teacher to adopt an innovation.

The relationship that existed between the total number of students enrolled in the vocational agriculture program and diffusion was expressed by a coefficient of correlation of .585, which is significant at the one percent level of confidence. A coefficient of correlation of .465 existed between the number of non-farm students enrolled in vocational agriculture and diffusion of the innovation, which is also significant at the one percent level of confidence.

In addition to showing the variables that are significantly correlated with diffusion, the intercorrelation matrix shows that several of the variables had only very slight relationships with the dependent variable. Of all the independent variables, the administrator's attitude toward cooperative agricultural occupations training had the least relationship (.136) with diffusion.

Other independent variables which were not significantly related to the dependent variable included: offering of separate agricultural mechanics class (.157), school's per pupil expenditure (-.176), and number of vocational education training programs offered by the school (.200). The number of agricultural training stations available in the community and diffusion of the innovation had a coefficient of correlation of .344, which was not significant at the five percent level of confidence.

The intercorrelation matrix also shows the relationship existing among independent variables included in the study. The coefficient of correlation of .460 obtained between the number of agricultural training stations available in the community and the number of vocational education training programs offered by the school, was significant at the one percent level of confidence.

Variables significantly related to the number of students enrolled in vocational agriculture and their coefficients of correlation are: (1) the number of non-farm students enrolled in vocational agriculture, .823; (2) the number of teachers employed in the vocational agriculture department, .828; and (3) the offering of a separate agricultural mechanics class in the vocational agriculture department, .433. The first two are significant at the one percent level of confidence, and the last at the five percent level of confidence.

The number of non-farm students enrolled in vocational agriculture is closely related to the number of teachers of vocational agriculture employed by the school. The coefficient of correlation is .515, which is significant at the one percent level of confidence.

The relationship existing between the number of teachers employed in the vocational agriculture department and the offering of a separate agricultural mechanics class in the vocational agriculture department is expressed by a coefficient of correlation of .375, which is significant at the five percent level of confidence.

Categorization of Programs According to Stages in the Diffusion Process

In analyzing relationships between independent variables and the diffusion of cooperative agricultural occupations curricula, subjects have been grouped according to stages in the diffusion process to facilitate conceptualization of the findings of this study. However, it should be kept in mind that for the purpose of testing relationships among variables, diffusion scores (rather than stages of diffusion) were utilized.

Scores obtained by the Diffusion Scale and definitions drawn from theory were used to categorize programs according to stages of the diffusion process. The diffusion score limits actually used are shown in Table II. (See Appendix E for actual distribution of scores.)

TABLE II

NUMBER OF PROGRAMS CATEGORIZED BY STAGES OF DIFFUSION

Stages of Diffusion	Number of Respondents	Percentage Included in Stage	Diffusion Score Limits*
Interest	9	28.1	2.4 - 6.8
Evaluation	7	21.9	9.6 - 13.6
Trial	8	25.0	15.0 - 37.6
Adoption	8	25.0	39.0 - 46.2

N = 32, $\overline{X}$ = 20.79

* Number gaps between stages represent actual gaps in diffusion scores.

These stages are generally characterized as follows:

Interest--means that school personnel are aware of the innovation, but that only the earliest attempts have been made to diffuse cooperative agricultural occupations curricula into the program. Individuals may also be seeking more information about the innovation and its merits.

Evaluation--means that information and evidence has been weighed and sifted to determine the possible usefulness and applicability of cooperative agricultural occupations curricula under the existing conditions into which it would have to fit.

Trial--means that cooperative agricultural occupations curricula have been tentatively tried on a small scale to test its workability in the school and community.

Adoption--means that cooperative agricultural occupations curricula have been completely incorporated into the vocational agriculture program.

Adopter Categorization by Innovativeness Scores

Similar to the procedure for classifying programs according to stage of diffusion, teachers were classified according to adopter categories based upon teachers' innovativeness scores. Since adopter distributions usually appear to approximate a normal bell-shaped curve over time, teachers included in the study were assigned to adopter categories on the basis of their innovativeness score. Adopter categorization was used to facilitate conceptualization of the relationships disclosed by the findings. Innovativeness scores (rather than the adopter categories) were used to test for relationships. The innovativeness score limits used to classify teachers as innovators and early adopters, early majority, late majority, and laggards are shown in Table III. Since this study had a relatively small number of subjects, innovators and early adopters have been grouped into one category. (See Appendix E for actual distribution of scores.)

TABLE III

NUMBER OF TEACHERS CATEGORIZED BY ADOPTER CATEGORIES

Adopter Category	Number of Respondents	Percentage Included in Category	Innovativeness Score Limits*
Innovators and Early Adopters	5	16	8.08 - 12.76
Early Majority	11	34	13.38 - 16.71
Late Majority	11	34	20.63 - 28.23
Laggards	5	16	28.80 - 47.14

N = 32, $\bar{X}$ = 20.44

* Number gaps between categories represent actual gaps in teachers innovativeness scores. The smaller the innovativeness score, the more innovative the teacher.

These categories are generally described as follows:

Innovators and Early Adopters--refers to the first 16 percent of the teachers to adopt a new idea.

Early Adopter--refers to the next 13.5 percent of the teachers to adopt a new idea.

Early Majority--refers to the next 34 percent of the teachers to adopt a new idea.

Late Majority--refers to the next 34 percent of the teachers to adopt a new idea.

Laggards--refers to the last 16 percent of the teachers to adopt a new idea.

Test of the Hypotheses of the Study

The second part of the analyses was the testing of hypotheses of the study and analysis of relationships. The test of each hypothesis was accomplished by the application of the appropriate coefficient of correlation, tested for significance, which indicated the degree of relationship existing between each independent variable and the dependent variable of the study. Each hypothesis is listed and then followed by the findings related to that particular hypothesis.

Hypothesis 1.--Teacher innovativeness is related to diffusion of cooperative agricultural occupations curricula.

This hypothesis was supported at the one percent level of confidence. A study of the data in Table IV show the distribution of teacher innovativeness in relation to stages of the diffusion process.

Of the teachers included in the study who were classified as innovators and early adopters, or early majority, 75 percent were in schools where the innovation was past the evaluation stage of the diffusion process. Eighty percent of the innovators and early adopters were in schools where the innovation was past the evaluation stage. This is compared to only 25 percent of the late majority and laggards who were in schools where the innovation was past the evaluation stage. None of the subjects classified as late majority or laggards were in schools where the innovation had reached the adoption stage. Only one subject classified as innovator and early adopter was in a school which was below the trial stage of the diffusion process.

TABLE IV

TEACHER INNOVATIVENESS BY STAGES OF DIFFUSION

Teacher Innovativeness	Stages of Diffusion			
	Interest	Evaluation	Trial	Adoption
Laggards	1	3	1	0
Late Majority	5	3	3	0
Early Majority	2	1	3	5
Early Adopters and Innovators	1	0	1	3

$N = 32, \bar{X} = 20.44$

Hypothesis 2.--Administrator's attitude toward cooperative agricultural occupations training is related to diffusion of cooperative agricultural occupations curricula.

With reference to administrator's attitude toward the innovation, the hypothesis was rejected. No significant relationship exists between administrator's attitude toward cooperative agricultural occupations training and diffusion of the innovation into the program. In general, the administrator's attitude toward the innovation was high, ranging from 48 to 78 points with a possible score of 88 and a mean of 60.71.

The data in Table V show the distribution of administrators' attitude scores in relation to stages of the diffusion process. Of the administrators who received an attitude score at or above the mean (60.71), 67 percent were in schools where the innovation was at the trial or adoption stage, and 33 percent were in schools where the innovation was at the interest or evaluation stage. This is compared to only 28 percent of the administrators with attitude scores below the mean with diffusion at the trial or adoption stage, and 72 percent below the trial stage.

TABLE V

ADMINISTRATORS' ATTITUDE TOWARD THE INNOVATION BY STAGES OF DIFFUSION

Administrator's Attitude Score	Stages of Diffusion			
	Interest	Evaluation	Trial	Adoption
47 - 53	0	3	0	1
54 - 60	5	3	4	1
61 - 67	2	0	4	4
68 and over	2	1	0	2

N = 32, $\overline{X}$ = 60.71

Hypothesis 3.--School's per pupil expenditure is related to diffusion of coöperative agricultural occupations curricula.

The correlation test of significance applied to the data revealed that no significant relationship existed between the school's per pupil expenditure and diffusion of the innovation.

The data in Table VI show the distribution of the school's per pupil expenditure in relation to stages of the diffusion process. The range in per pupil expenditure was great--$321.12 to $676.47, with a mean of $442.07. Part of this variation could be attributed to the wide variation in size of schools included in the study. Sixty-two percent of the schools had a per pupil expenditure at or below the mean. Of these schools, approximately 48 percent were at the trial or adoption stage of the diffusion process.

TABLE VI

SCHOOL'S PER PUPIL EXPENDITURE
BY STAGES OF DIFFUSION

School's Per Pupil Expenditure	Stages of Diffusion			
	Interest	Evaluation	Trial	Adoption
300 - 375	0	0	1	1
376 - 450	6	6	4	5
451 - 525	1	1	3	2
526 and over	2	0	0	0

N = 32, $\bar{X}$ = 442.07

When all schools were considered, equal numbers were found at the interest or evaluation stages and at the trial or adoption stages of the diffusion process. The two schools having the highest per pupil expenditure were only at the interest stage, while the two schools with the lowest per pupil expenditure were at the trial or adoption stage.

Hypothesis 4.--The number of agricultural training stations available in the community is related to diffusion of cooperative agricultural occupations curricula.

The correlation test applied to the data collected revealed that no significant relationship existed between the number of agricultural training stations available in the community and diffusion of the innovation.

The data in Table VII show the distribution of the number of agricultural training stations available in the community in relation to stages of diffusion of the innovation. The number of businesses, as identified by the teacher of vocational agriculture as potential agricultural occupations training stations in his community, ranged from 2 to 28, with a mean of 13.09.

TABLE VII

NUMBER OF TRAINING STATIONS AVAILABLE
BY STAGES OF DIFFUSION

Number of Training Stations Available	Stages of Diffusion			
	Interest	Evaluation	Trial	Adoption
1 - 6	4	3	0	1
7 - 12	3	2	3	2
13 - 18	0	1	3	1
19 and over	2	1	2	4

N = 32, $\bar{X}$ = 13.09

Seventy-one percent of the programs with thirteen or more training stations available were at the trial or adoption stage of the diffusion process. This is compared to only 33 percent of the programs with less than thirteen training stations available which were at or above the trial stage. Four programs with the number of training stations available above the mean were found below the interest stage, and only three programs below the mean were at the adoption stage of the diffusion process.

Hypothesis 5.--The number of students enrolled in vocational agriculture is related to diffusion of cooperative agricultural occupations curricula.

A correlation test of significant relationship supported the hypothesis at the one percent level of confidence.

The data in Table VIII show, by the distribution of programs at the various diffusion stages, the relationship between the number of students enrolled in vocational agriculture and stages of diffusion of the innovation. There was a range of 33 to 142 students enrolled in vocational agriculture among the schools included in the study. The average enrollment was 60.69.

Of the programs that had an enrollment in vocational agriculture at or above the mean, 83 percent were past the evaluation stage, and 50 percent were at the adoption stage of the diffusion process. Programs with an enrollment below the mean were mainly clustered in the interest and evaluation stages. Only two programs with enrollment below 45 were at the trial stage. All programs with an enrollment of over 75 were found to be at the trial or adoption stage.

TABLE VIII

ENROLLMENT IN VOCATIONAL AGRICULTURE BY STAGES OF DIFFUSION

Enrollment in Vocational Agriculture	Stages of Diffusion			
	Interest	Evaluation	Trial	Adoption
30 - 44	5	3	2	0
45 - 59	3	3	2	2
60 - 74	1	1	1	1
75 and over	0	0	3	5

N = 32, $\bar{X}$ = 60.69

Hypothesis 6.--The number of non-farm students enrolled in vocational agriculture is related to diffusion of cooperative agricultural occupations curricula.

With reference to the number of non-farm students enrolled in vocational agriculture, as identified by the teacher of vocational agriculture, the hypothesis was supported at the one percent level of confidence in a test of correlation.

Data presented in Table IX reveal the distribution of non-farm enrollment in vocational agriculture in relation to stages of diffusion of the innovation. Non-farm enrollment in vocational agriculture ranged from 11 to 114, with a mean of 41.38

Nearly 70 percent of the programs with a non-farm enrollment above the mean were past the evaluation stage, and all programs with a non-farm enrollment of 58 or over were at the trial or adoption stage of the diffusion process. These findings can be compared to only thirty-five percent of the programs that fell below the mean that were at the trial or adoption stage. Only three programs with enrollment below the mean were at the adoption stage.

TABLE IX

NON-FARM ENROLLMENT IN VOCATIONAL AGRICULTURE BY STAGES OF DIFFUSION

Non-Farm Enrollment in Vocational Agriculture	Stages of Diffusion: Interest	Evaluation	Trial	Adoption
10 - 25	4	2	2	1
26 - 41	2	4	2	2
42 - 57	3	1	2	1
58 and over	0	0	2	4

N = 32, $\bar{X}$ = 41.38

Hypothesis 7.--The number of teachers in the vocational agriculture department is related to diffusion of cooperative agricultural occupations curricula.

The correlation test of significance applied to the data collected revealed that a significant relationship existed between the number of vocational agriculture teachers employed by the school and diffusion of the innovation at the one percent level of confidence. Consequently, the hypothesis was accepted.

Of the schools included in the study, 24 had one teacher of vocational agriculture, seven had two, and one had three. Data in

Table X show the distribution of the number of teachers of vocational agriculture in relation to stages of diffusion of the innovation. All multiple-teacher departments were past the evaluation stage, and 55 percent were at the adoption stage.

Two-thirds of the single-teacher departments were below the trial stage, and nearly 38 percent were only at the interest stage of the diffusion process. Only three of the twenty-four single-teacher departments had adopted the innovation.

TABLE X

NUMBER OF VOCATIONAL AGRICULTURE TEACHERS
BY STAGES OF DIFFUSION

Number of Vocational Agriculture Teachers	Stages of Diffusion			
	Interest	Evaluation	Trial	Adoption
1	9	7	5	3
2	0	0	2	5
3	0	0	1	0

N = 32

Hypothesis 8.--The offering of a separate agricultural mechanics class in the vocational agriculture department is related to diffusion of cooperative agricultural occupations curricula.

The correlation test between diffusion of the innovation and the offering of a separate agricultural mechanics class did not reveal sufficient relationship at the five percent level of confidence to substantiate the hypothesis.

The data in Table XI reveal the distribution of whether or not a separate agricultural mechanics class was offered in relation to stages of the diffusion process. Of the fourteen programs offering a separate agricultural mechanics class, 57 percent were past the evaluation stage, and nearly 30 percent had adopted the innovation. This is compared to 45 percent of the programs not offering a separate class which were at the trial or adoption stage, and 22 percent which had adopted the innovation. Eight programs in each group were past the evaluation stage of the diffusion process.

TABLE XI

OFFERING OF SEPARATE AGRICULTURAL MECHANICS CLASS BY STAGES OF DIFFUSION

Offer Separate Agricultural Mechanics Class	Stages of Diffusion			
	Interest	Evaluation	Trial	Adoption
No	5	5	4	4
Yes	4	2	4	4

N = 32

Hypothesis 9.--The number of vocational education programs offered by the school is related to diffusion of cooperative agricultural occupations curricula.

With reference to the number of vocational education programs offered by the school, the hypothesis was rejected at the five percent level of confidence.

The data in Table XII show the distribution of the number of vocational education programs offered by the school in relation to stages of the diffusion process. The number of vocational programs offered by the schools included in the study ranged from 1 to 10, with a mean of 3.21. There were seven schools in which vocational agriculture was the only vocational program offered. None of these schools had adopted the innovation, and only two were at the trial stage. However, the school with the most vocational programs (10) was only at the evaluation stage.

TABLE XII

NUMBER OF VOCATIONAL PROGRAMS IN THE SCHOOL BY STAGES OF DIFFUSION

Number of Vocational Programs in School	Stages of Diffusion			
	Interest	Evaluation	Trial	Adoption
1 - 2	6	3	4	3
3 - 4	1	2	2	2
5 - 6	2	1	2	3
7 and over	0	1	0	0

N = 32, $\bar{X}$ = 3.21

Forty-five percent of the schools offering three or less vocational programs were past the evaluation stage. This is compared to 58 percent of the schools offering more than three vocational programs which were in the trial or adoption stage of the diffusion process.

Relationship Between a Composite of Variables and the Criterion

In the third part of the analyses, partial and multiple coefficients of correlation were computed between the independent variables and the criterion (diffusion of cooperative agricultural occupations curricula into the vocational agriculture program) of the study. A multiple regression analysis, by taking into account the intercorrelations among the independent variables was used to select the combination of independent variables which accounted for the greatest amount of variation in the criterion. Machine analyses determined the order of entry of variables into the regression equation.

Table XIII reports the results of applying multiple regression analysis techniques to the data with diffusion of the innovation serving as the dependent variable. The table shows the extent to which the variation away from the mean diffusion score was explained by the independent variables. The variables as listed accounted for 70 percent of the variation.

The number of teachers in the vocational agriculture department accounted for 36.4 percent of the variation in diffusion of the innovation. This one variable accounted for slightly more than one-half of all the variation accounted for by all nine independent variables considered in the study.

Innovativeness of the teacher claimed an additional 15.2 percent of the variation. Additional variation accounted for by other independent variables, in the order they were entered into the multiple regression equation, are: (1) offering of separate agricultural

TABLE XIII

RESULTS OF REGRESSION ANALYSIS

Order of Entry into Regression Analysis	Variable Name	Computed R	Cumulative Percentage of Variance Accounted for by R
1	Number of Teachers	.603	36.4
2	Innovativeness of Teacher	.718	51.6
3	Offering of Agricultural Mechanics	.744	55.4
4	Non-farm Enrollment	.765	58.5
5	Administrator's Attitude	.797	63.5
6	Enrollment in Vocational Agriculture	.809	65.4
7	Expenditures per Pupil	.823	67.7
8	Number of Training Stations	.837	70.1
9	Number of Vocational Programs	.837	70.1

mechanics class, 3.8 percent; (2) the number of non-farm students enrolled in vocational agriculture, 3.1 percent; (3) administrator's attitude toward the innovation, 5.0 percent; (4) the number of students enrolled in vocational agriculture, 1.9 percent; (5) the school's per pupil expenditure, 2.3 percent; and (6) the number of agricultural training stations available in the community, 2.4 percent.

The number of vocational education programs offered by the school did not account for any of the variation. Therefore, it is of doubtful value as a predictor of diffusion of cooperative agricultural occupations curricula.

The Multiple Regression Equation

The final part of the analyses was the formulation of a multiple regression equation which may be useful as an aid in predicting diffusion of cooperative agricultural occupations curricula into a program.

Garrett (26, p. 404) stated that the chief value of partial and multiple correlation is ". . . the fact that it enables us to set up a multiple regression equation of two or more variables by means of which we can predict another variable or criterion."

When all independent variables were considered, except the number of vocational education programs offered by the school which did not account for any of the variation in the criterion, the multiple regression equation in score form is as follows:

$$Y' = -.875X_1 + .883X_2 - .057X_3 - .383X_4 + .415X_5$$
$$- .043X_6 + 3.316X_7 + 8.063X_8 - 7.794$$

The values $-.875$, $.883$, . . . 8.063 are the score weights (constants) by which the independent variables are multiplied. The variables are identified as follows:

Y' - Predicted diffusion score

X_1 - Teacher innovativeness score

X_2 - Administrator's attitude score toward cooperative agricultural occupations training

X_3 - School's per pupil expenditure

X_4 - Number of agricultural training stations available in the community

X_5 - Number of students enrolled in vocational agriculture

X_6 - Number of non-farm students enrolled in vocational agriculture

X_7 - Number of teachers in the vocational agriculture department (use -1 for only one teacher and +1 for two or more teachers)

X_8 - Offering of separate agricultural mechanics class in the vocational agriculture department (use -1 for yes and +1 for no)

These products and the constant, -7.794, are summed algebraically resulting in Y', the predicted diffusion score.

The accuracy with which it is possible to predict criterion scores using the regression equation is indicated by the standard error of estimate. The standard error of estimate associated with the regression equation is 9.827. This means that the changes are two in three that a predicted diffusion score will not miss the actual score by more than ± 9.827. In general, about two-thirds of all predicted adoption scores will lie within ± 9.827 points of their earned values.

The multiple regression equation appears to be satisfactory for the purpose of predicting diffusion of cooperative agricultural occupations curricula into a vocational agriculture program. The minimum diffusion score required for a program to be classified in the various stages of the diffusion process were: 39.0 for adoption; 15.0 for trial; 9.6 for evaluation; and 2.4 for interest.

In applying the standard error of estimate (9.827), a predicted diffusion score of 39.0 minus 9.827 would only move the program from the adoption to trial stage of the diffusion process. Similarly, a school with a predicted diffusion score of 2.4 plus 9.827 would only move the program from the interest to evaluation stage of the diffusion process.

Therefore, the regression equation appears to be useful as one tool in predicting diffusion of cooperative agricultural occupations curricula into a vocational agriculture program in Oklahoma. The equation may or may not be useful in other states.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This study was concerned with personal and situational variables which inhibit and stimulate the adoption of cooperative agricultural occupations curricula as an innovation in vocational agriculture by Institute participants. Institute participants basically received the same training and encouragement to adopt the innovation, yet their program outcomes appeared to vary greatly. Basically, the study was concerned with identifying variables which account for the variation in diffusion of cooperative agricultural occupations curricula.

Data were collected by separate interviews with the vocational agriculture teacher and administrator in thirty-two Oklahoma public secondary schools. Schools utilized in the study were selected using the following criteria: (1) teachers were participants in one of the Agricultural Occupations Institute workshops, conducted at Oklahoma State University during the summers of 1965 or 1966, and (2) they were still teaching vocational agriculture where they taught at the time of enrollment in the Institute.

Five instruments were constructed to obtain data for the study. They included: (1) a teacher interview schedule designed to gather data related to the vocational agriculture department and the community, (2) a diffusion scale designed to measure diffusion of cooperative agricultural occupations curricula into the vocational agriculture program, (3) a teacher innovativeness scale designed to determine the extent of innovativeness of the teacher when adopting new ideas, (4) an administrator's interview schedule designed to assess data related to the school system, and (5) an administrator's attitude scale designed to measure the administrator's attitude toward cooperative agricultural occupations training.

Data were collected by interviewing teachers and administrators in their local schools during March and April, 1968. Data from the interviews were hand scored and scores were punched into IBM cards for machine analysis.

Statistical analyses were made using stepwise regression which included: (1) the computation of simple correlation matrix, (2) the computation of partial and multiple correlation coefficients, and (3) the formulation of a multiple regression equation which may be used as an aid in predicting diffusion of cooperative agricultural occupations curricula into a vocational agriculture program.

Limitations

Two limitations are apparent in this study. They are discussed at this point so that the reader may be cognizant of them while interpreting the results and conclusions of the study.

Since the study was based upon an ex post facto design, independent variables could not be controlled or manipulated. Thus, the reader must accept the assumption that data were not used which would intentionally bias results.

A second limitation has to do with the independent variables considered in the study. The prediction of future diffusion of cooperative agricultural occupations curricula requires consideration of all elements that may affect the diffusion process. Since only nine elements were considered in this study, the possible effect of other elements imposes a limitation on the findings and conclusions of this study.

Findings of the Study

This study was an investigation of the relationships existing among objective measures of independent variables and the diffusion of cooperative agricultural occupations curricula. The findings of the study are as follows:

1. The relationship between the number of teachers in the vocational agriculture department and the criterion was expressed by a coefficient of correlation of .603. The coefficient of correlation is significant at the one percent level of confidence.

The number of teachers in the department of vocational agriculture accounted for more of the variation (36.4 percent) in diffusion of cooperative agricultural occupations curricula than any other variable considered in the study. Therefore, the number of teachers in the vocational agriculture department appears to be mainly responsible for diffusion of cooperative agricultural occupations curricula. The mean diffusion score for multiple-teacher departments was 39.23, in comparison to a mean diffusion score of 15.03, for single-teacher departments.

2. The relationship between the number of students enrolled in vocational agriculture and the diffusion of cooperative agricultural occupations curricula was expressed by a coefficient of correlation of .585. Although the coefficient of correlation is significant at the one percent level of confidence, it only accounted for 1.9 percent of the variation in the criterion.

Programs at the trial and adoption stages of the diffusion process had a mean enrollment of 73.81 in vocational agriculture, in comparison to a mean enrollment of 47.56 for programs at the interest and evaluation stages of the diffusion process.

3. The relationship between teacher innovativeness and diffusion of cooperative agricultural occupations curricula was expressed by a coefficient of correlation of -.510. The coefficient of correlation is significant at the one percent level of confidence. The coefficient of correlation is negative because the lower the innovativeness score, the more innovative the teacher.

Teacher innovativeness accounted for 15.2 percent of the variation in the criterion. The mean diffusion score for programs where teachers were classified as innovators, early adopters, and early majority was 29.30, in comparison to a mean diffusion score of 14.38 for the late majority and laggards.

4. The relationship between the number of non-farm students enrolled in vocational agriculture and the criterion was expressed by a coefficient of correlation of .465. The coefficient of correlation is significant at the one percent level of confidence, and accounted for 3.1 percent of the variation in the criterion.

Programs above the evaluation stage of the diffusion process had a non-farm enrollment of 50.38 in vocational agriculture, in comparison to a mean non-farm enrollment of 31.75 for programs at the interest or evaluation stages.

5. The relationship between the number of agricultural training stations available in the community and the criterion was expressed by a coefficient of correlation of .344. The coefficient of correlation is not significant. The number of agricultural training stations available in the community accounted for 2.4 percent of the variation in the criterion.

6. The relationship between administrator's attitude toward cooperative agricultural occupations training and the criterion was expressed by a coefficient of correlation of .136. The coefficient of correlation is not significant. However, administrator's attitude accounted for 5.0 percent of the variation in diffusion of cooperative agricultural occupations curricula.

7. The relationship between the school's per pupil expenditure and the criterion was expressed by a coefficient of correlation of -.176. The coefficient of correlation is not significant; however, the school's per pupil expenditure accounted for 2.3 percent of the variation in the criterion.

Conclusions

The following conclusions, based on the findings of the study, emerge as being of particular importance:

1. Schools with a multiple-teacher vocational agriculture

department will probably be more successful in the implementation of cooperative agricultural occupations curricula than schools with single-teacher departments.

2. The more students enrolled in vocational agriculture, the greater the probability of cooperative agricultural occupations curricula being diffused into the program.
3. The more innovative the teacher of vocational agriculture, the greater the probability of cooperative agricultural occupations curricula being diffused into the program.
4. The more non-farm students enrolled in vocational agriculture, the greater the probability of cooperative agricultural occupations curricula being diffused into the program.
5. Administrators were highly favorable to cooperative agricultural occupations training. Therefore, administrators do not appear in most instances to be a serious threat to diffusion of cooperative agricultural occupations training. However, since administrator's attitude accounted for 5.0 percent of the variation in the criterion, it should be considered when predicting diffusion of cooperative agricultural occupations curricula into a vocational agriculture program.
6. The number of agricultural training stations available in the community, the school's per pupil expenditure and the offering of a separate agricultural mechanics class were not significantly related to diffusion of

cooperative agricultural ococupations curricula. However, since they accounted for additional variation in the criterion, and since this information is easily obtainable, they should be considered when predicting diffusion of cooperative agricultural occupations curricula.

7. The number of vocational education programs offered by the school is of doubtful value in predicting diffusion of cooperative agricultural occupations curricula.
8. A composite of the number of teachers in the vocational agriculture department, innovativeness of the teacher, offering of a separate agricultural mechanics course, the number of non-farm students enrolled in vocational agriculture, administrator's attitude toward cooperative agricultural occupations training, the enrollment in vocational agriculture, the per pupil expenditure, and the number of agricultural training stations available in the community may be used effectively in predicting diffusion of cooperative agricultural occupations curricula.
9. There was a significant correlation between four of the variables studied and diffusion which indicates that these factors do stimulate diffusion of cooperative agricultural occupations curricula. In order of importance, the variables are: (1) the number of

teachers in the vocational agriculture department, (2) the number of students enrolled in vocational agriculture, (3) innovativeness of the teacher, and (4) the number of non-farm students enrolled in vocational agriculture.

10. There was little correlation between five of the variables considered in the study and diffusion which indicates that these factors have not seriously inhibited the diffusion of cooperative agricultural occupations curricula. These variables are: (1) administrator's attitude, (2) the expenditure per pupil, (3) the number of agricultural training stations available in the community, (4) offering of a separate agricultural mechanics class, and (5) the number of vocational education programs offered by the school.

Recommendations

Findings of the study reveal that certain personal and situational variables were associated with diffusion of cooperative agricultural occupations curricula into a vocational agriculture program.

The following statements appear worthy of consideration by those who are responsible for promoting the implementation of cooperative agricultural occupations curricula:

1. A greater number of multiple-teacher departments needs to be established to effectively expand the vocational agriculture program by adding cooperative agricultural occupations curricula.

2. State staff personnel and in-service teacher trainers should consciously and deliberately identify and use the more innovative teachers of vocational agriculture to conduct pilot cooperative agricultural occupations training programs, and other purposeful changes in agricultural education.

3. Schools with large enrollments in vocational agriculture, and large non-farm enrollments, should be encouraged to supplement traditional agricultural production curricula with cooperative agricultural occupations training.

4. School administrators should be included in planning cooperative agricultural occupations experience programs and other innovations in agricultural education.

5. Since several of the teachers indicated they did not have sufficient help and encouragement to implement the innovation, perhaps state staff personnel should be more positive in their recommendations and exert greater leadership in actively promoting adoption of cooperative agricultural occupations curricula as a supplement to the total vocational agriculture program.

6. Teachers who have successfully implemented cooperative agricultural occupations curricula should be identified and used as cooperating teachers in teacher training programs.

7. To speed the adoption of cooperative agricultural occupations curricula, some means of providing incentives is needed. Perhaps, this could be in the form of student recognition for accomplishments in cooperative agricultural occupations experience programs similar to recognition given to students with outstanding supervised farming programs.

8. Institutes and other in-service training programs attempting to introduce innovations into the vocational agriculture target system should use objective means of selecting participants to enhance adoption of new ideas.

9. Development of instructional material for classroom use in preparing students for agricultural occupations may encourage adoption of cooperative agricultural occupations curricula.

10. Supervised training in off-farm agricultural occupations should be provided for vocational agriculture enrollees who do not have adequate home opportunities for supervised practices in production agriculture.

11. Greater articulation and educator cooperation among vocational education programs on the state and local levels may speed adoption of innovations in vocational education and make the change process less haphazard.

12. Further research relating the diffusion and adoption processes to change and innovations in agricultural education is needed.

13. Additional research is needed to identify other factors which stimulate and inhibit the adoption of cooperative agricultural occupations curricula and other innovations in agricultural education.

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APPENDIX A

SCHOOLS INCLUDED IN THE STUDY

Name of School	City or Town Where School is Located
Charles Page High School	Sand Springs, Oklahoma
Haileyville High School	Haileyville, Oklahoma
Stigler High School	Stigler, Oklahoma
Gould High School	Gould, Oklahoma
Carl Albert High School	Midwest City, Oklahoma
Warner High School	Warner, Oklahoma
Medford High School	Medford, Oklahoma
Newcastle High School	Newcastle, Oklahoma
Lexington High School	Lexington, Oklahoma
Hartshorne High School	Hartshorne, Oklahoma
Seminole High School	Seminole, Oklahoma
Manual Training High School	Muskogee, Oklahoma
Jenks High School	Jenks, Oklahoma
Blackwell High School	Blackwell, Oklahoma
Okeene High School	Okeene, Oklahoma
Sallisaw High School	Sallisaw, Oklahoma
Vinita High School	Vinita, Oklahoma
Guthrie High School	Guthrie, Oklahoma
Ponca City High School	Ponca City, Oklahoma
Latta High School	Ada, Oklahoma
Collinsville High School	Collinsville, Oklahoma
Leedey High School	Leedey, Oklahoma
El Reno High School	El Reno, Oklahoma
Roland High School	Roland, Oklahoma

Schools Included in the Study (continued)

Name of School	City or Town Where School is Located
Norman High School	Norman, Oklahoma
Watonga High School	Watonga, Oklahoma
Poteau High School	Poteau, Oklahoma
Madill High School	Madill, Oklahoma
Altus High School	Altus, Oklahoma
Broken Arrow High School	Broken Arrow, Oklahoma
Minco High School	Minco, Oklahoma
Durant High School	Durant, Oklahoma

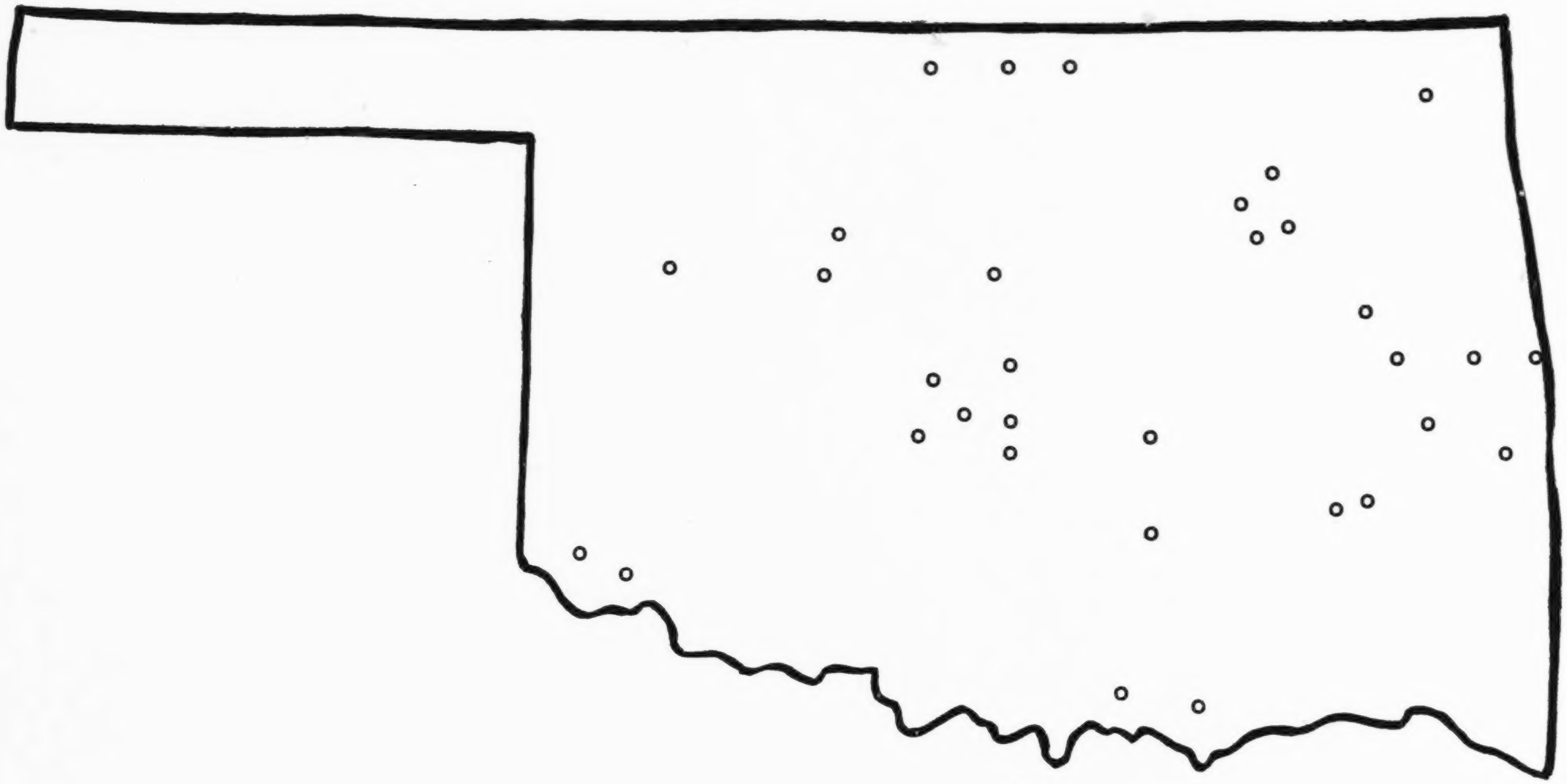

Figure 2. Geographic Location of Oklahoma Schools Included in the Study

APPENDIX B

DIFFUSION SCALE

Items included in the diffusion scale and their weighted values are as follows:

		Weighted Value
1.	Artifacts (class notebook, student displays, etc.) of student effort in cooperative agricultural occupations training are present in the classroom.	2.8
2.	Definitive criteria exist for the selection of students participating in the cooperative occupational experience program in agriculture.	3.4
3.	A training agreement form is signed by the training station manager, student, and parents.	4.2
4.	School personnel such as the principal, guidance counselor, etc., have been asked to advise students of occupational opportunities.	2.4
5.	The administration is aware of the nature and extent of the program (number of students enrolled, where most of them are employed, etc.).	3.8
6.	Students may schedule cooperative agricultural occupations training with few conflicts with other classes needed for graduation.	4.4
7.	The teacher of agriculture has visited at least one other vocational agriculture department to observe an occupational experience program in operation.	1.2
8.	Teacher receives released school time for supervision of students on-the-job.	4.6
9.	Over fifty percent of the agribusiness merchants in the community have been contacted personally by someone representing the program.	3.2
10.	The teacher meets with the training station manager regularly to evaluate the trainee's progress.	5.0
11.	The question of student insurance was discussed with training station managers before the student went to work.	4.0
12.	Some attempt is made to appraise the program of occupational experience periodically with persons outside of the vocational agriculture department.	4.4

		Weighted Value
13.	The teacher has or plans to participate directly in the selection of training stations for student occupational experience.	4.0
	Total Possible Points	47.4

ADMINISTRATOR'S ATTITUDE SCALE

Statements included in the administrator's attitude scale and their t values are listed as follows:

		t value
1.	Emphasis on production agriculture should be reduced if necessary to include cooperative agricultural occupations training.	3.36
2.	Cooperative occupations training represents an appropriate means of expanding the traditional vocational agriculture program.	3.71
*3.	Cooperative agricultural occupations training is a "passing fancy" and will become obsolete in a few years.	3.11
4.	Vocational agriculture programs offering only training for future farmers are out-of-date.	5.10
5.	Students with training in cooperative agricultural occupations will find jobs readily available upon graduation from high school.	2.31
*6.	Cooperative agricultural occupations training requires the involvement and cooperation of too many people for the program to be a success.	3.87
7.	Cooperative agricultural occupations training improves the total school system by broadening the curriculum.	2.32
8.	Cooperative agricultural occupations training provides businesses in agriculture with a better trained and more capable beginning employee.	3.46
9.	The shy awkward student has a better chance of developing communication skills in cooperative agricultural occupations training than in the traditional agriculture program.	2.49
*10.	Industry and businesses related to agriculture should be responsible for training their own employees.	4.28
11.	Cooperative agricultural occupations training provides a necessary link among the school, agriculture, and businesses.	3.68
*12.	Students enrolled in cooperative agricultural occupations training should be required to have an agricultural project at home or on the farm.	2.55

		t value
*13.	Cooperative agricultural occupations training should be delayed until a student completes high school.	3.30
14.	Students mainly enroll in programs with on-the-job training to develop competencies necessary for employment.	2.28
15.	School consolidation will increase the need for cooperative agricultural occupations training.	2.81
*16.	High school students are not mature enough for cooperative agricultural occupations training.	2.60
17.	Teachers of vocational agriculture should be required to include cooperative agricultural occupations curricula in their program.	3.84
*18.	Vocational agriculture has adequate enrollment without cooperative agricultural occupations training.	3.58
19.	Agricultural business merchants often learn new merchandising methods from student trainees.	2.45
20.	On-the-job training is a necessary part of cooperative agricultural occupations training.	3.00
21.	High school credit should be given for on-the-job training.	3.53
*22.	The per pupil cost of providing cooperative agricultural occupations training is too great to be included as a permanent part of the school curriculum.	4.29

* = Unfavorable Statements.

APPENDIX C

Vocational Research Coordinating Unit
Oklahoma State University
302 Gundersen Hall
Stillwater, Oklahoma 74074

August 10, 1967

Mr. ____________________
Superintendent of Schools
______________, Oklahoma

Dear Mr.______________:

As new innovations are being introduced rapidly in education, there appears to be a need to assess the variables which stimulate or inhibit adoption of new educational practices. The Oklahoma Vocational Research Coordinating Unit in cooperation with the Agricultural Education Department at Oklahoma State University, the State Board for Vocational Education, and the United States Office of Education is conducting a study concerning innovations in vocational agriculture. The study is directed toward assessing the variables which inhibit or stimulate the adoption of cooperative agricultural occupations curricula. Please understand that we are not attempting to make the judgment as to whether or not new curricula should be adopted, but are simply trying to get a better understanding of the change process in education.

Because of the recognition your school has obtained for outstanding contributions to vocational agriculture education and because a member of your faculty participated in one of the Agricultural Occupations Institute workshops at Oklahoma State University, I would like to include your school in the study.

Data for the study will be collected by the undersigned through separate interviews with the vocational agriculture teacher who participated in the Institute and the school administrator who is mainly responsible for supervision of the vocational agriculture department.

Your cooperation in this study will be deeply appreciated and will assist in providing needed research in education. The information you contribute will be kept strictly confidential. From the collection and analysis of the data and your participation in the study, a significant contribution will be made to education.

The interviews will be conducted after January, 1968; however, I would like to visit in your school and community early this fall

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so that we may become better acquainted. I will contact you by phone for an appointment for a visit. The vocational agriculture teacher at your school who participated in the Agricultural Occupations Institute will be contacted by separate letter concerning this study.

I am looking forward to meeting you and becoming better acquainted with your school system and community.

Sincerely,

David L. Williams

David L. Williams
Research Assistant

Vocational Research Coordinating Unit
Oklahoma State University
302 Gundersen Hall
Stillwater, Oklahoma 74074

August 12, 1967

Mr. ______________________
Vocational Agriculture Instructor
______________________, Oklahoma

Dear Mr. ____________________:

As new innovations are being introduced rapidly in education, there appears to be a need to assess the variables which stimulate or inhibit adoption of new educational practices. The Oklahoma Vocational Research Coordinating Unit in cooperation with the Agricultural Education Department at Oklahoma State University, the State Board for Vocational Education, and the United States Office of Education is conducting a study concerning innovations in vocational agriculture. The study is directed toward assessing the variables which inhibit or stimulate the adoption of cooperative agricultural occupations curricula. Please understand that we are not attempting to make the judgment as to whether or not new curricula should be adopted, but are simply trying to get a better understanding of the change process in education.

Because of your outstanding leadership in vocational agriculture education and because of your participation in one of the Agricultural Occupations Institute workshops, I would like to include your school in this study. The study will include separate interviews with you and one administrator in the school system.

The interviews will be conducted after January, 1968; however I would like to visit with you early this fall so I may become better acquainted with you and your program. I will contact you by phone for an appointment. Your superintendent has been contacted by separate letter concerning this study.

Your cooperation in this study will be deeply appreciated and will assist in answering some current questions faced by vocational agriculture educators. I am looking forward to meeting you and becoming better acquainted with your vocational agriculture program.

Sincerely,

David L. Williams

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Research Assistant

APPENDIX D

TEACHER INTERVIEW SCHEDULE

1. What is your age? ____________________

2. How many college credit hours do you have above the B.S. Degree?
____

3. Do you have an M.S. Degree? ____________________

4. How many years have you taught vocational agriculture? __________

5. How many years have you taught vocational agriculture in this school? ____________________

6. How many agricultural businesses are there in the community which may have a need for part-time student help? __________
How many students could be employed part-time by these businesses?
____

7. How many students are presently enrolled in vocational agriculture courses? Vocational Agriculture I ____; Vocational Agriculture II ____; Vocational Agriculture III ____; Vocational Agriculture IV ____; Agricultural Mechanics ____; Cooperative Agricultural Occupations Training ____.

8. How many non-farm students (parents earn less than 50% of the family's net income from farm) are enrolled in vocational agriculture classes? ____________________

9. Have you had any occupational experience in businesses related to agriculture? ____ If so, what types of business? __________

*10. What is the size of your community (population)? __________

11. How many students are presently placed in agricultural businesses for on-the-job training which you supervise? __________

12. Do students receive released school time for on-the-job training?
____

13. How many hours do you have scheduled classes per day? __________

14. Which school year did you first have a separate Agricultural Occupations Training class? ____________________

15. How many students enrolled in vocational agriculture classes are employed part-time in jobs where they receive regular pay? ______
How many of these students are employed by relatives? __________

* Indicates information that is readily available and will be secured by the investigator prior to the interview.

DIFFUSION SCALE

Note: The investigator checked the items accomplished by the department of vocational agriculture following a visit in the department and an interview with the teacher.

____ 1. Artifacts (class notebook, student displays, etc.) of student effort in cooperative agricultural occupations training are present in the classroom.

____ 2. Definitive criteria exist for the selection of students participating in the cooperative occupational experience program in agriculture.

____ 3. A training agreement form is signed by the training station manager, student, and parents.

____ 4. School personnel such as the principal, guidance counselor, etc., have been asked to advise students of occupational opportunities.

____ 5. The administration is aware of the nature and extent of the program (number of students enrolled, where most of them are employed, etc.).

____ 6. Students may schedule cooperative agricultural occupations training with few conflicts with other classes needed for graduation.

____ 7. The teacher of agriculture has visited at least one other vocational agriculture department to observe an occupational experience program in operation.

____ 8. Teacher receives released school time for supervision of students on-the-job.

____ 9. Over fifty percent of the agribusiness merchants in the community have been contacted personally by someone representing the program.

____ 10. The teacher meets with the training station manager regularly to evaluate the trainee's progress.

____ 11. The question of student insurance was discussed with training station managers before the student went to work.

____ 12. Some attempt is made to appraise the program of occupational experience periodically with persons outside of the vocational agriculture department.

____ 13. The teacher has or plans to participate directly in the selection of training stations for student occupational experience.

TEACHER INNOVATIVENESS SCALE

Instruction: Please respond by indicating the year you first began using each practice. If the year of adoption was an estimate, please indicate "Estimated Adoption Date." If the practice is not used and not applicable to your situation, please indicate "Not Used, Not Applicable." If the practice is applicable to your situation but not used, please indicate "Applicable, Not Used."

PRACTICES	Year First Used	Estimated Adoption Date	Not Used, Not Applicable	Applicable, Not Used
1. Using testing equipment for quality control in welding.				
2. Providing students with skeleton outline of each unit of instructions.				
3. Displaying Federal Land Bank (or other) agricultural product price charts to show up-to-date prices.				
4. Using a system of color dynamics as a safety measure in the shop.				
5. Keeping an individual record (one for each student) of teacher visits to places of student's supervised training.				
6. Maintaining a file describing employment opportunities available in the broad field of agriculture.				
7. Including instructions in small air-cooled engines as a part of the curriculum.				
8. Using the station method of teaching agricultural mechanics.				

	Year First Used	Estimated Adoption Date	Not Used, Not Applicable	Applicable, Not Used
9. Using local occupational skill contests to aid in student motivation (welding contests, Horticulture I.D. contests).				
10. Using test plots (seed varieties, fertilizers, etc.) for demonstration purposes in the community.				
11. Maintaining an index of bulletins, books, etc., available in the department.				
12. Maintaining an up-to-date scrapbook of chapter activities.				
13. Using bulletin board displays to feature improved methods in farming.				
14. Maintaining an organized file of transparencies to be used in teaching.				
15. Displaying current publications featuring improved methods in farming.				
16. Using a labeling system to identify location of items in the shop and/or classroom.				

ADMINISTRATOR INTERVIEW SCHEDULE

1. Which of the following vocational programs are offered in your school?

   ____ A. Vocational Agriculture
   ____ B. Business and Office Education (Typing, Shorthand, Bookkeeping, etc.)
   ____ C. Distributive Education
   ____ D. Health Occupations Training
   ____ E. Home Economics
   ____ F. Technical Education (Electronics, Drafting, etc.)
   ____ G. Trades and Industrial Education (Auto Mechanics, Cosmetology, Welding, etc.)
   ____ H. Others: ____________________

2. What was your school's per pupil operational cost for the 1966-67 school year? ____________________

3. What is the enrollment in your school? ____________________

*4. How many teachers are employed in your vocational agriculture department? ____________________

*5. Does your school offer a separate agricultural (farm) mechanics course in the vocational agriculture department? __________

6. How many years have you been a school administrator? ________

7. How many years have you been a school administrator in a school where vocational agriculture was offered? ____________________

8. How many years have you been an administrator in this school?
____

* Indicates information that is readily available and will be secured by the investigator prior to the interview.

ADMINISTRATOR'S ATTITUDE SCALE

Cooperative Agricultural Occupations Training is defined as an educational program made possible by a cooperative agreement among the secondary school authorities, merchants, and parents of students participating in the program . It includes classroom instruction in agricultural occupations and on-the-job training under the direction of the vocational agriculture teacher.

Instructions: Please respond by indicating your degree of agreement or disagreement relative to each statement using the following scale: Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D), or Strongly Disagree (SD).

1. Emphasis on production agriculture should be reduced if necessary to include cooperative agricultural occupations training. SA A UD D SD

2. Cooperative occupations training represents an appropriate means of expanding the traditional vocational agriculture program. SA A UD D SD

3. Cooperative agricultural occupations training is a "passing fancy" and will become obsolete in a few years. SA A UD D SD

4. Vocational agriculture programs offering only training for future farmers are out-of-date. SA A UD D SD

5. Students with training in cooperative agricultural occupations will find jobs readily available upon graduation from high school. SA A UD D SD

6. Cooperative agricultural occupations training requires the involvement and cooperation of too many people for the program to be a success. SA A UD D SD

7. Cooperative agricultural occupations training improves the total school system by broadening the curriculum. SA A UD D SD

8. Cooperative agricultural occupations training provides businesses in agriculture with a better trained and more capable beginning employee. SA A UD D SD

9. The shy, awkward student has a better chance of developing communication skills in cooperative agricultural occupations training than in the traditional agriculture program. SA A UD D SD

10. Industry and businesses related to agriculture should be responsible for training their own employees. SA A UD D SD

11. Cooperative agricultural occupations training provides a necessary link among the school, agriculture, and businesses. SA A UD D SD

12. Students enrolled in cooperative agricultural occupations training should be required to have an agricultural project at home or on the farm. SA A UD D SD

13. Cooperative agricultural occupations training should be delayed until a student completes high school. SA A UD D SD

14. Students mainly enroll in programs with on-the-training to develop competencies necessary for employment. SA A UD D SD

15. School consolidation will increase the need for cooperative agricultural occupations training. SA A UD D SD

16. High school students are not mature enough for cooperative agricultural occupations training. SA A UD D SD

17. Teachers of vocational agriculture should be required to include cooperative agricultural occupations curricula in their program. SA A UD D SD

18. Vocational agriculture has adequate enrollment without cooperative agricultural occupations training. SA A UD D SD

19. Agricultural business merchants often learn new merchandising methods from student trainees. SA A UD D SD

20. On-the-job training is a necessary part of cooperative agricultural occupations training. SA A UD D SD

21. High school credit should be given for on-the-job training. SA A UD D SD

22. The per pupil cost of providing cooperative agricultural occupations training is too great to be included as a permanent part of the school curriculum. SA A UD D SD

APPENDIX E

TABLE XIV

FREQUENCY DISTRIBUTION OF DIFFUSION SCORES IN INTERVALS OF ONE SCORE UNIT

Score*	Frequency	Score*	Frequency
46	1	23	1
45		22	
44		21	
43	3	20	
42	2	19	1
41		18	
40		17	
39	2	16	
38	1	15	2
37		14	1
36		13	2
35		12	1
34	2	11	1
33		10	2
32		9	
31		8	
30		7	3
29		6	1
28	1	5	
27		4	1
26		3	2
25		2	2
24		1	

$N = 32$, $\bar{X} = 20.79$

* Scores rounded to nearest whole number

TABLE XV

FREQUENCY DISTRIBUTION OF TEACHERS INNOVATIVENESS SCORES IN INTERVALS OF ONE SCORE UNIT

Score*	Frequency	Score*	Frequency
47	1	27	1
46		26	3
45		25	
44		24	1
43		23	
42		22	2
41		21	
40		20	3
39		19	
38		18	
37		17	3
36		16	
35		15	3
34		14	4
33	1	13	2
32	1	12	1
31	1	11	
30		10	1
29	1	9	1
28	1	8	1

N = 32, $\overline{X}$ = 20.44

* Scores rounded to nearest whole number

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TITLE

Personal and Situational Variables Which Inhibit or Stimulate the Adoption of Agricultural Occupations Curricula as an Innovation in Vocational Agriculture by Institute Participants

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RETRIEVAL TERMS

Adoption of Educational Innovations by Teachers
Diffusion of Innovations
Change Process in Vocational Education
Cooperative Agricultural Occupations Curricula Diffusion

IDENTIFIERS

ABSTRACT

The purpose of this study was to determine the relationship between selected variables and diffusion of cooperative agricultural occupations curricula into vocational agriculture programs. Data were collected by separate interviews with the vocational agriculture instructor and administrator in thirty-two Oklahoma public secondary schools. Schools utilized in the study were selected using the following criteria: (1) teachers were participants in one of the Agricultural Occupations Institute workshops conducted at Oklahoma State University during the summers of 1965 and 1966, and (2) they were still teaching vocational agriculture where they taught at the time of enrollment in the Institute.

Five instruments were constructed to obtain data for the study. They included: (1) a teacher interview schedule, (2) a diffusion scale, (3) a teacher innovativeness scale, (4) an administrator interview schedule, and (5) an administrator's attitude scale. Stepwise regression was used to analyze the data.

Results of the study indicated that four variables had a significant correlation with diffusion of cooperative agricultural occupations training. They were: (1) the number of teachers in the vocational agriculture department, (2) the number of students enrolled in vocational agriculture, (3) teacher innovativeness, and (4) the number of non-farm students enrolled in vocational agriculture. The study identified eight variables, accounting for 70 percent of the variation away from the mean diffusion score, which may be used effectively in predicting diffusion of cooperative agricultural occupations curricula into a vocational agriculture program.